K-BUS® Switch Actuators

User manual -Ver. 2

KA/R 0416.1

KA/R 0816.1

KA/R 1216.1

KNX/EIB Intelligent Installation Systems

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1. Introduction

This manual provides you the detailed technical information about the Switch Actuators, not only the installation and programming details, but also the usage explanation in actual application. They can be installed in the distribution boards on 35mm mounting rails according to EN60715.

These switch actuators can be used to control the switch loads, such as:

- Lighting
- Heating control
- Signal devices

1.1 Product and function overview

The switch actuators are the modular installation devices, with 2, 8 and 12 outputs for selection, using EIB BUS connection terminals to connect to the system. The switch actuators are connected to the AC power supply directly instead of an extra voltage supply. It is able to use the Engineering Tool Software ETS (ETS2 v1.3 or later) with a VD2/VD3 file to allocate the physical address and set the parameters, but a VD3 file imported is required for EST3 software.

It is able to switch from 4 to 12 independent electrical AC loads or three-phase loads by the switch actuators with maximum output of 16A per output and manual switch, as well as visible switching status.

There are same following programming functions for each output:

- time function: on/off delay
- staircase function with the warning and adjustable staircase lighting time
- scene, preset control: 8bit/1bit
- logic operation: AND, OR, XOR, gate function
- status response
- forced operation and safe function
- threshold function setup
- control of electro thermal valve function
- selection of preferred status after bus voltage failure and recovery

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2. Technical Properties & Dimension and Connection Diagram

2.1 Technical Properties:

The switch actuators are modular installation devices in pro*M* design, which are easy to install in the distribution boards on 35mm mounting rails via bus connection terminal to connect to EIB/KNX system.

It is able to switch at most 12 individuals outputs by these switch actuators, and the loads are connected to them by using screw terminals in groups of 2 contacts, and each output is controlled separately by EIB/KNX system.

Power supply	-Operation voltage	21~30 V DC, via EIB bus
	-Current consumption EIB/KNX	< 12 mA
	-Power consumption EIB/KNX	Max. 360 mW
Output nominal values	-Type KA/R	0416.1 0816.1 1216.1
	-number of contacts	4 8 12
	-U_n rated voltage	250V AC(50~60Hz)
	-I_n rated current	16A 16A 16A
	-Max. switching current	20A/250V AC
	-Power loss per device at max. load	2W 4W 8W
Output life expectancy	-Mechanical endurance	$>10^6$
	-Electrical endurance	$>10^4$
Output switching times	-Operation period per output	55ms
	-Delay times after switching on	30ms
	-Delay times after switching off	25ms
Connections	-EIB/KNX	Bus connection terminal (0.8mmΦ)
	-Load output connection terminal	Screw terminal
Operation/display	-Red Led and push button	assigning the physical address
	-Green Led flashing	the application layer works normally
	- Indication of the contact position	close means the output is on

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		open means the output is off
Housing	-IP20	to EN60529
Safety class	-II	to EN61140
Temperature range	-Operation	-5 ℃ ~+ 45 ℃
	-Storage	-25 ℃~+ 55 ℃
	-Transport	-25 ℃ ~+ 70 ℃
Ambient condition	- Humidity	<93%, except dewing
Design	-Modular DIN-Rail Component (MDRC)	35mm Din rail, modular installation
	-Dimension (L×W×H)mm	KA/R 0416.1: 90×71.5×60
		KA/R 0816.1: 90×143×60
		KA/R 1216.1: 90×214.5×60
Weight	-In kg	KA/R 0416.1: 0.3
		KA/R 0816.1: 0.5
		KA/R 1216.1: 0.7

Electrical endurance		
load	**100,000 cycles**	**30,000 cycles**
Incandescent lamp	1,250 W	2,500 W
Fluorescent lamp, not compensated	1,200 W	2,500 W
Fluorescent lamp, Parallel compensated	650 W/70 µF	1,300 W/140 µF
Fluorescent lamp, duo-combination	2×1,200 W	2×2,500 W
Halogen lamp (230 VAC)	1,200 W	2,500 W
Low-voltage halogen lamp with transformer	500 VA	500 VA
Mercury arc/sodium discharge lamp not compensated	1,000 W	2,000 W
Mercury arc/sodium discharge lamp parallel compensated	1,000 W/70 µF	2,000 W/140 µF
Dulux lamp, not compensated	800 W	1,600 W
Dulux lamp, parallel compensated	560 W/70 µF	1,100 W/140 µF

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Note: The above load is only for single lamps. In the case of several lamps in parallel, the load will be reduced, although the power is unchanged, but the instantaneous impact of current will increase, and easy to make the relay contacts melted. In normal use, the maximum output current is preferably less than 10A, and inductive load and capacitive load will be lower.

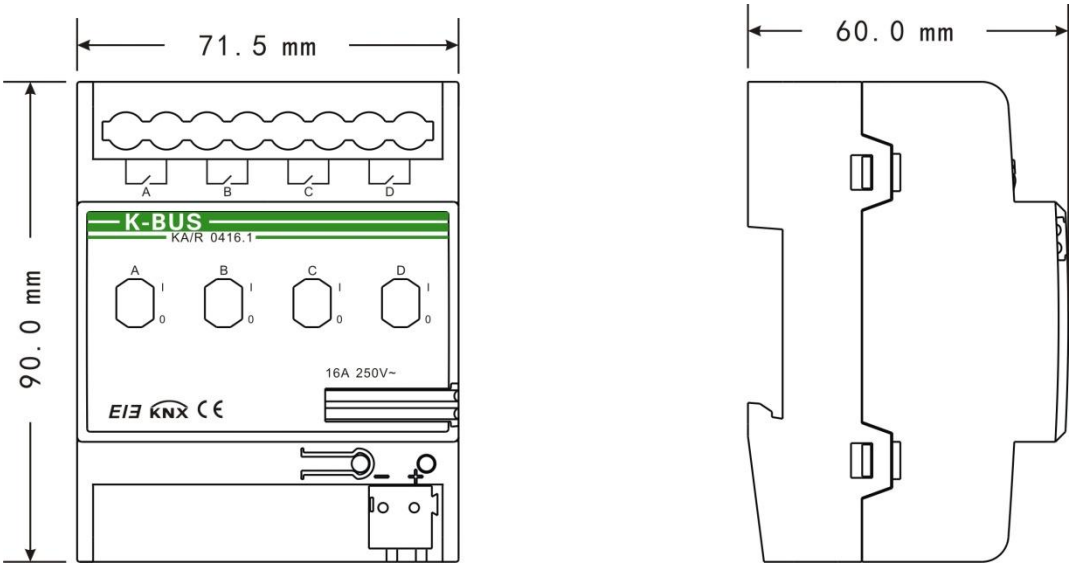
Application programs

Type	Max. number of communication objects	Max. number of group addresses	Max. number of associations
KA/R 0416.1	59	85	85
KA/R 0816.1	115	160	160
KA/R 1216.1	171	250	250

2.2 Dimension and Connection Diagram

2.2.1 KA/R 0416.1

2.2.1.1Dimension drawing:



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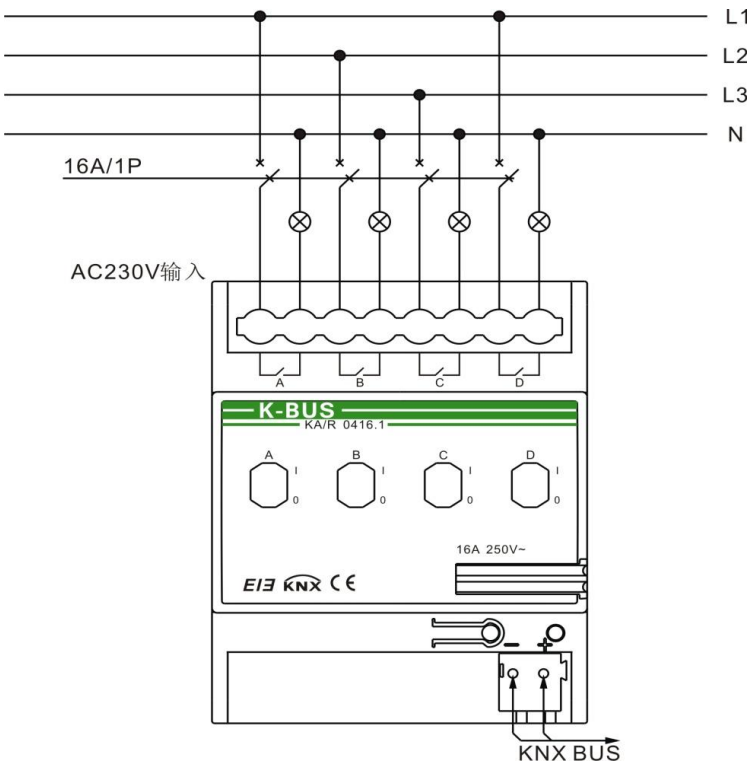
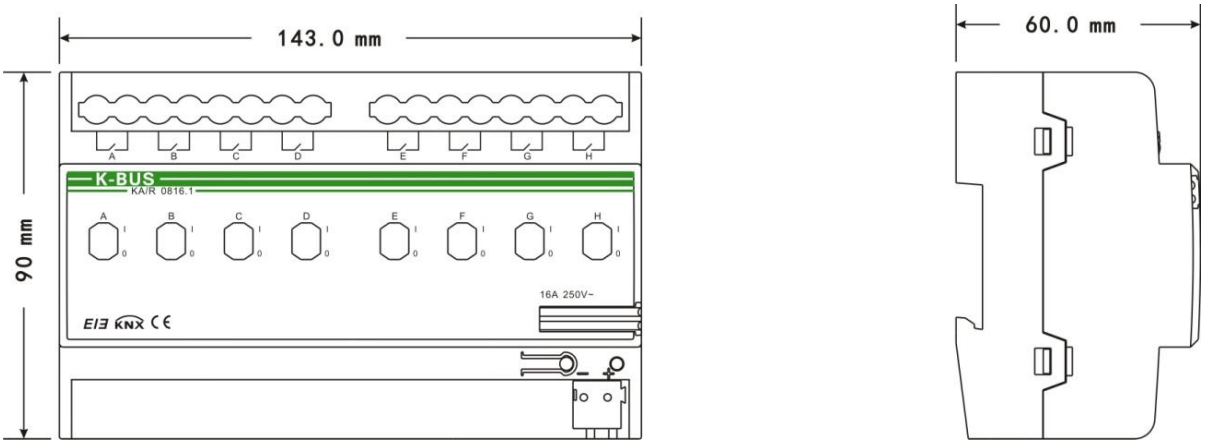
2.2.1.2Connection Diagram:



2.2.2 KA/R 0816.1

2.2.2.1 Dimension drawing:



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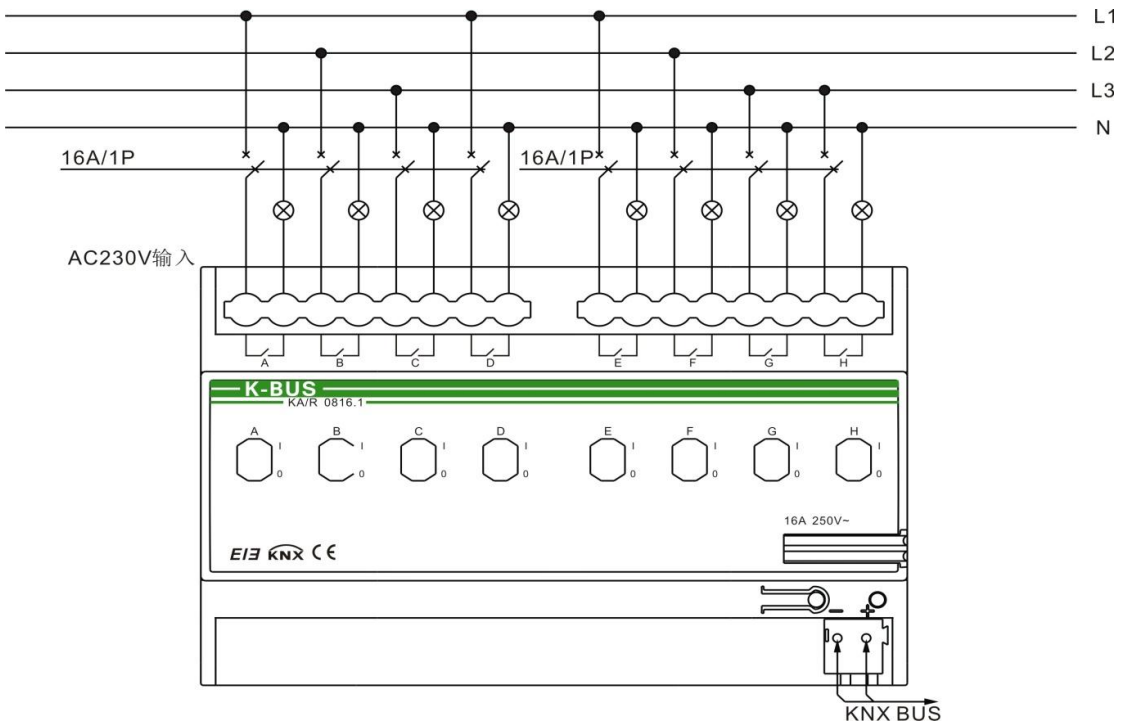
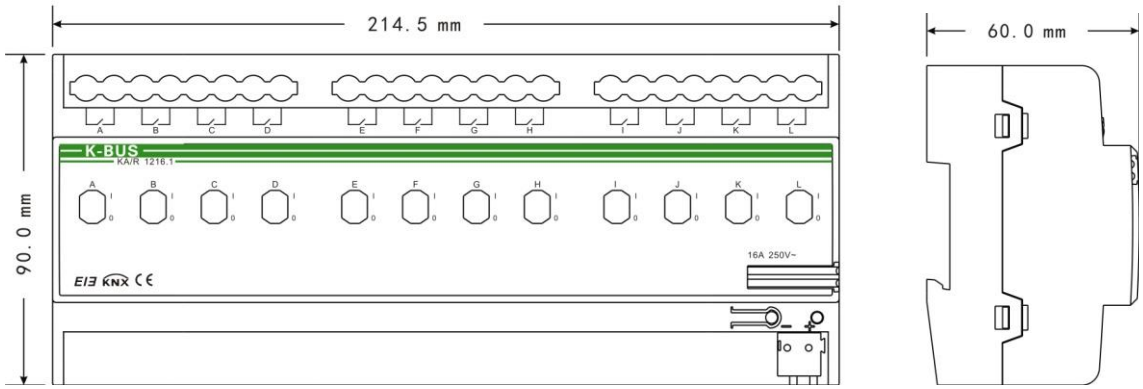
2.2.2.2 Connection Diagram:



2.2.3 KA/R 1216.1

2.2.3.1 Dimension drawing:



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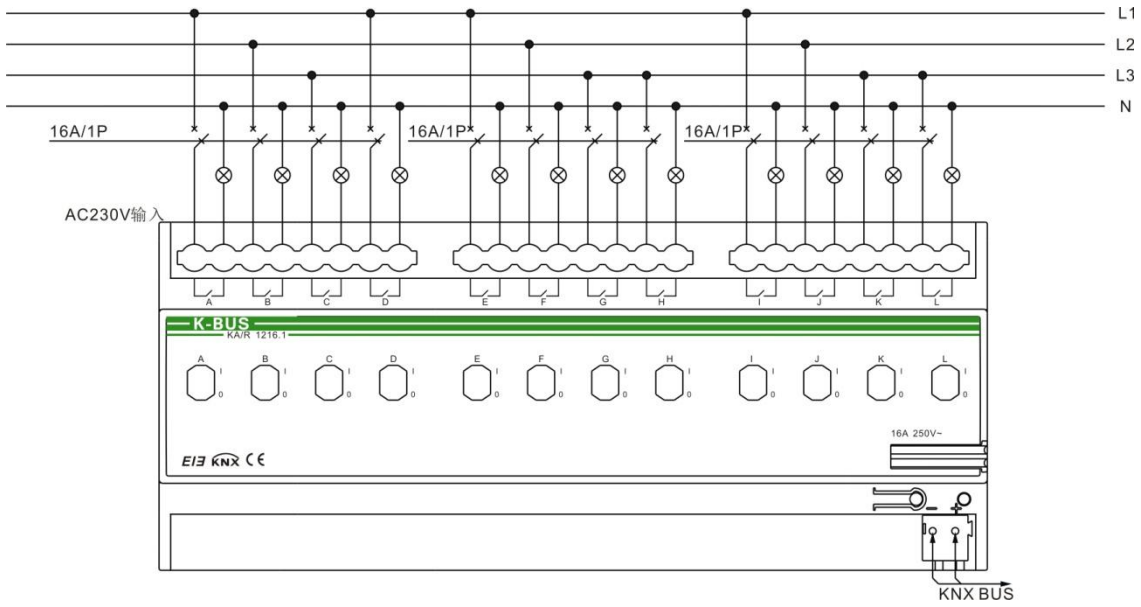
2.2.3.2 Connection Diagram:



3. Commissioning

3.1 Overview

Every output has two operation modes (main function):

① Switch actuator

It is used for normal switching, for instance lighting control, which uses the object "Switch" to control the output directly. Lots of additional functions such as timming, logical, safety functions are available to use. Application description can be found in below text.

② Dynamic regulating Actuator

In this function, the output is used to control the cooling/heating temperature. In some room, thermostat will send a control value out to switch the valve (e.g. 2-step control). Application description can be found in below text.

3.2 Parameter window "All General"

The parameter window "All General" will be shown in Fig. 2.1, which applies to every output.

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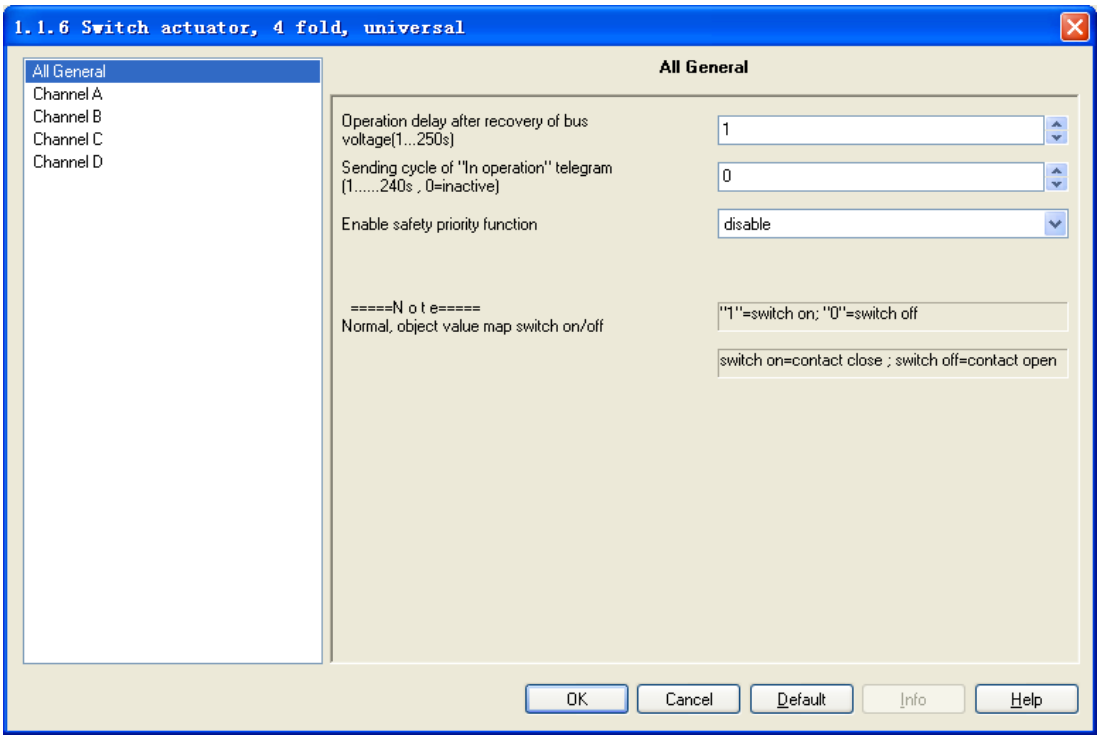

Fig. 2.1 parameter window "All General"

Note: "Switch on" mentioned below means the contact of the switch actuator is closed (output is on); "switch off" means the contact of the switch actuator is open (output is off)!

Parameter "*Operation delay after recovery of bus voltage (1...250s)*"

The parameter determines the delay time to react after the bus voltage recovery (the delay time after electrified) to avoid the malfunction of the bus and 220V AC caused by the simultaneously working of various relays, excluding the initialization time (approx. 2 seconds) of the device.

Options: *1-250 seconds*

If there are other devices (e.g. monitor) require to read the communication target value of the relay during the delay time after power on, then this requirement will be recorded, and then reacted after the delay time is finished.

If the delay time is long enough, all contacts of the relay can work simultaneously.

Note: the first switching action will only be initiated when enough energy is available to trigger all contacts to react after electrified. This means it will take some time for the first switching action after electrified, but the telegram will be sent immediately after electrified. Considering that it will also generate damage to the power system and bus, so it is suggested to set the different delay time to each device.

Parameter "*Sending cycle of 'in operation' telegram (1...240s, 0 = inactive):*"

The parameter determines the time interval to send the telegram which shows the actuator is working

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normally or not via the bus. With the setting "*0*", the actuator doesn't send the telegram; if the setting is not "*0*", a telegram with the value "*1*" will be sent cyclically according to the setting to the bus.

Options: 0…240s, 0=cyclical send inactive

It is suggested to select the maximum time interval according to the application to keep the bus load as low as possible.

Note: it is starting to count the time after power up, instead of the operation delay after recovery of bus voltage.

Parameter "*Enable Safety priority function*"

The parameter is used to set the enable status of the function "*Safety priority*".

Options: E*nable*

Disable

If "*disable*" is selected, it will not activate the function "*Safety priority*"; if "*enable*" is selected, 2 "*Safety priority*" will be activated, whose parameter window can be shown in Fig. 2.2.

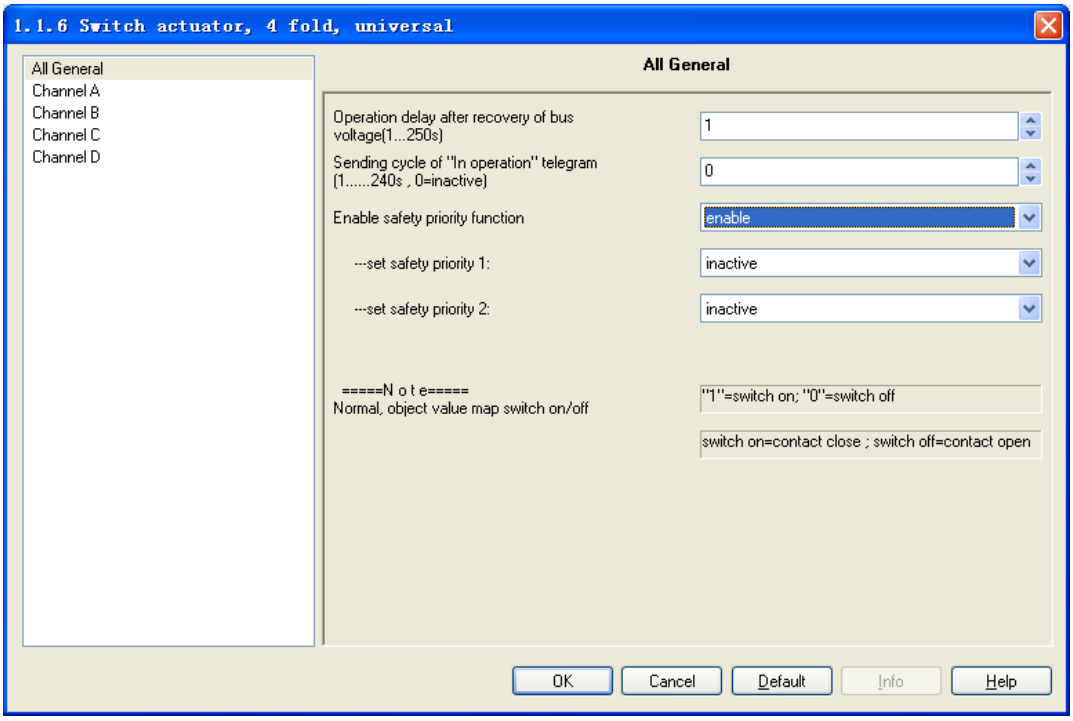

Fig. 2.2 parameter window "Safety priority"

Parameter "*set safety priority x:*", x = 1, 2

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There are 2 safety priorities for selecting. It is available to define the trigger condition to each "*Safe priority*", and also enable the correspondent communication object "*Safety Priority x*" (x=1, 2). These objects are important to the entire relay when under the working mode "*Switch Actuator*" and "*Dynamic regulating actuator*", but each output can react differently depending on the received telegrams, whose reactions can be defined in the parameter window "*X: Safety*".

Options: *inactive*

enable be safe by Object value "0"

enable be safe by Object value "1"

If the communication object "*Safety Priority x*" receives "*0*", the "*Control period*" of "*the Safety Priority x*" will be initiated with "*enable be safe by Object value "0"*"; if the communication object "*Safety Priority x*" receives "*1*", the "*Control period*" of "*the Safety Priority x*" will be initiated with "*enable be safe by Object value "1"*". This means, during the "*Control period*", if the object "*Safety Priority x*" receives no corresponding telegram, it will trigger "*Safety Priority*", and then the correspondent action will be initiated, which will be defined in the parameter window "*X: Safety*". When the setting is "*inactive*", it will not initiate any "*Safety Priority*".

Parameter "*Control period of safety priority X, X=1,2 (1…240s, 0=inactive)*"

It will not be visible unless the parameter "*set safety priority x:* (x= 1，2)" is activated. If there is no telegram received from the object "*Safety Priority x* (x=1，2)" during the "*Control period*", this "*Safety Priority x*" will be initiated.

It will end the trigger of "*Safety Priority x*" when the object "*Safety Priority x* (x=1, 2)" receives the telegram again, and the "*Control period*" of "Safety Priority x" will be reset at the same time.

Option: *0...240s*

It will not activate any "*Safety Priority x*" when selecting "*0*".

The monitoring time of "*Safety priority*" should be more than double as long as the cyclical sent time of the sensor to avoid the alarming in case some individual signal is neglected.

3.3 Parameter window " Channel X"-Switch actuator

The parameter window "*Channel X*" is shown in Fig. 2.3. It works for all the outputs. "*Channel X*" or "*X*" mentioned below means any output of the switch actuator, which has the same parameter setup interface and communication objects.

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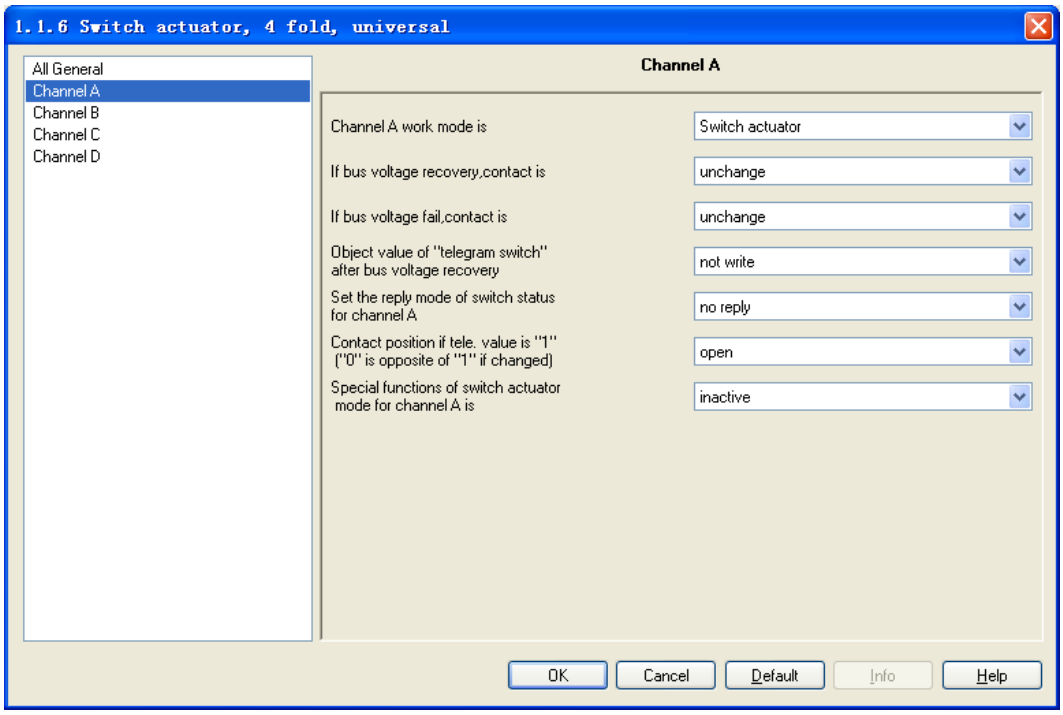

Fig. 2.3 parameter window "channel: X"

It is able to choose an operation mode and its corresponding functions for every output, and the functions are activated separately.

Parameter "*Channel X work mode is*"

This parameter is used to define the output mode.

Options: *Switch Actuator*

Dynamic regulating actuator

"*Switch Actuator*" is used in the normal switch control such as lighting. The outputs are controlled by various functions such as logic operation, timing function and safe function. More details can be found below.

Parameter "*If bus voltage recovery, contact is*"

The output can adopt a defined status on bus voltage recovery via this parameter.

Options: *Unchange*

open

closed

As before bus voltage fail

When selecting "*Unchange*", the contact of the relay will remain the same as the last status before power off; when selecting "*open*", the contact will be open; while it is closed when selecting "*closed*". The contact position after voltage recovery is the same as that before power off with "*As before bus voltage fail*".

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Parameter "*If bus voltage fail, contact is*"

The output can adopt a defined status after the bus voltage failure via this parameter.

Options: *Unchange*

open

closed

When selecting "*Unchange*", the contact of the relay will remain the same as the last status before power off; when selecting "*open*", the contact will be open; while it is closed when selecting "*closed*".

Parameter "*object Value of 'Telegram Switch' after bus voltage recovery*"

This parameter will be visible when enabling the logic function "*input 0*" to define the default value of the communication object "*Switch, X*" after bus voltage recovery, which can be "*0*" or "*1*". If selecting "*not write*", the value "*0*" is written into the object "*Telegram Switch*" and remains until this value is changed via the bus.

Options: *not write*

to write with 0

to write with 1

Parameter "*Set the reply mode of switch status for channel X*"

This parameter defines the status of the current switch status when the telegram is sent.

Options: *no reply*

always respond, after read only

Transmit after change

If selecting "*no reply*", there is no telegram to send out; if selecting "*always respond, after read only*", the status telegram will not be sent out until receiving the status telegrams from other devices; if selecting "*Transmit after change*", it will send the status automatically when there is any changes on the output.

The value ("*0*" or "*1*") of the communication object "*reply the switch status, x*" and "*send the switch status, X*" defines the current status of the relay, which can be set in the parameter "*Object value of switch status:*" (when selecting "*always respond, after read only*" or "*Transmit after change*").

Parameter "*Object value of switch status:*"

Options: 0=contact close ; 1=contact open

0=contact open ; 1=contact close

This parameter will be visible when selecting "*always respond, after read only*" or "*Transmit after change*" in "*Set the reply mode of switch status for channel X*". It means the contact of the relay will be closed when the

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value of the communication object "*reply the switch status, x*" and "*send the switch status, X*" is 0 when setting "*0=contact close; 1=contact open*", while it is open when the value is "*1*". It means the opposite with setting "*0=contact open; 1=contact close*".

Parameter "*Contact position if tele. Value is '1' ('0' is opposite of '1' if changed)*"

This parameter defines the contact position when starting the switch, which will be triggered by the communication object "*switch, X*". When enabling "*input 0*" in the logic function, it will use the communication object "*switch, X*" to modify the value of "*input 0*", rather than triggering the switch operation.

Options: *unchange*

Open

Close

The contact position stays the same with "*unchange*"; it will be open with "*Open*", and off with "*Close*". When ending the operation, position will be reversed if it is changed after starting (for instant, selecting "*open*" or "*close*"), otherwise, it will remain the same.

Note: The parameter only works after receiving object "*Switch x*", and defines the direction of the contact after receiving it. More details can be found in the below form:

Parameter	Switch X value=1	Switch X value=0
Unchange	Unchange	Unchange
Open	Contact open (OFF)	Contact close (ON)
close	Contact close (ON)	Contact open (OFF)

Parameter "*Special functions of switch actuator mode for channel X is*"

This parameter defines whether enable the special functions of the switch actuator. The parameter window "*X: Function*" will be seen with "*active*", and able to set the special functions individually in Fig. 2.4. Enable or disable the special function in "*X: Function*", seen in Fig. 2.5.

Options: *active*

inactive

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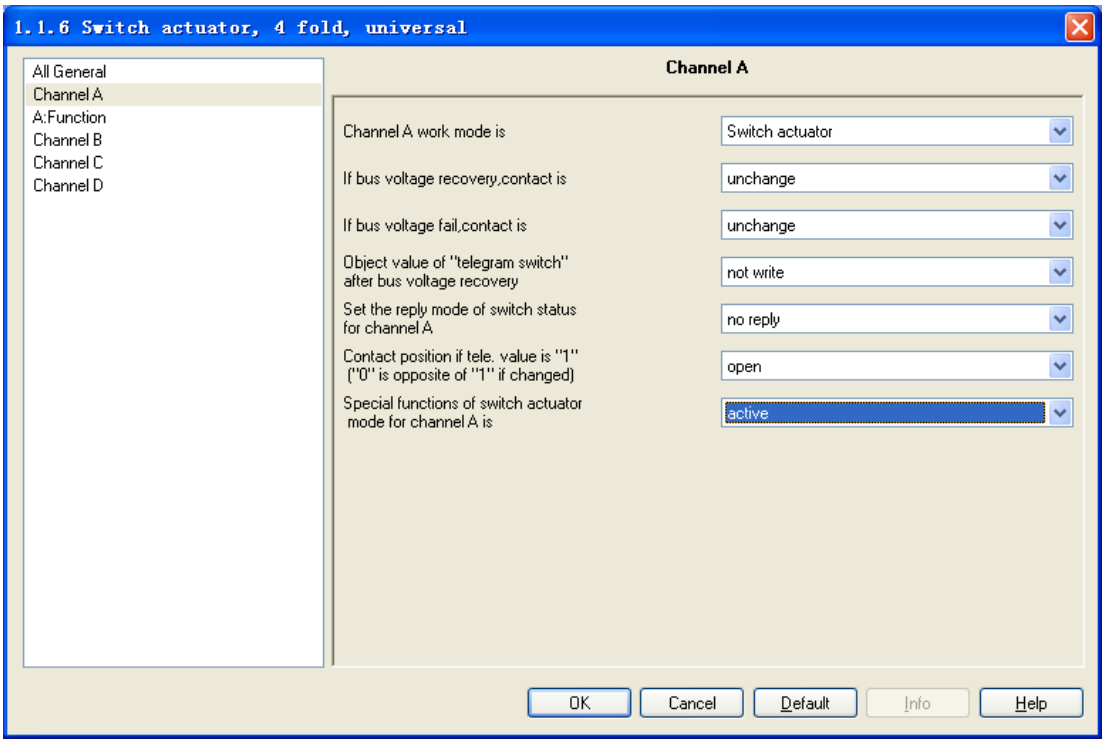

Fig. 2.4 starting setup window "X: Function"

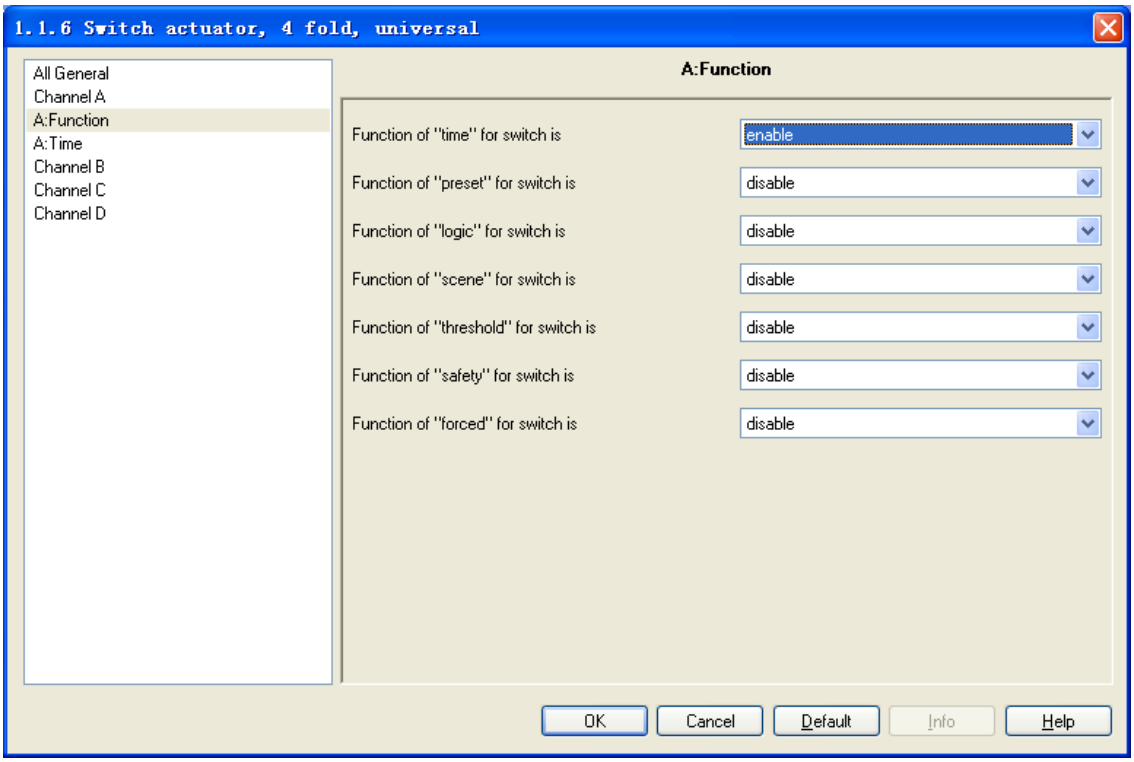

Fig. 2.5 setup window "X: Function"

3.3.1 Parameter window "X: Time"

This parameter window will become visible when selecting "*enable*" in the parameter "*Function of 'time' for*

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switch is" in the setup window "*X:Function*". See Fig. 2.6.

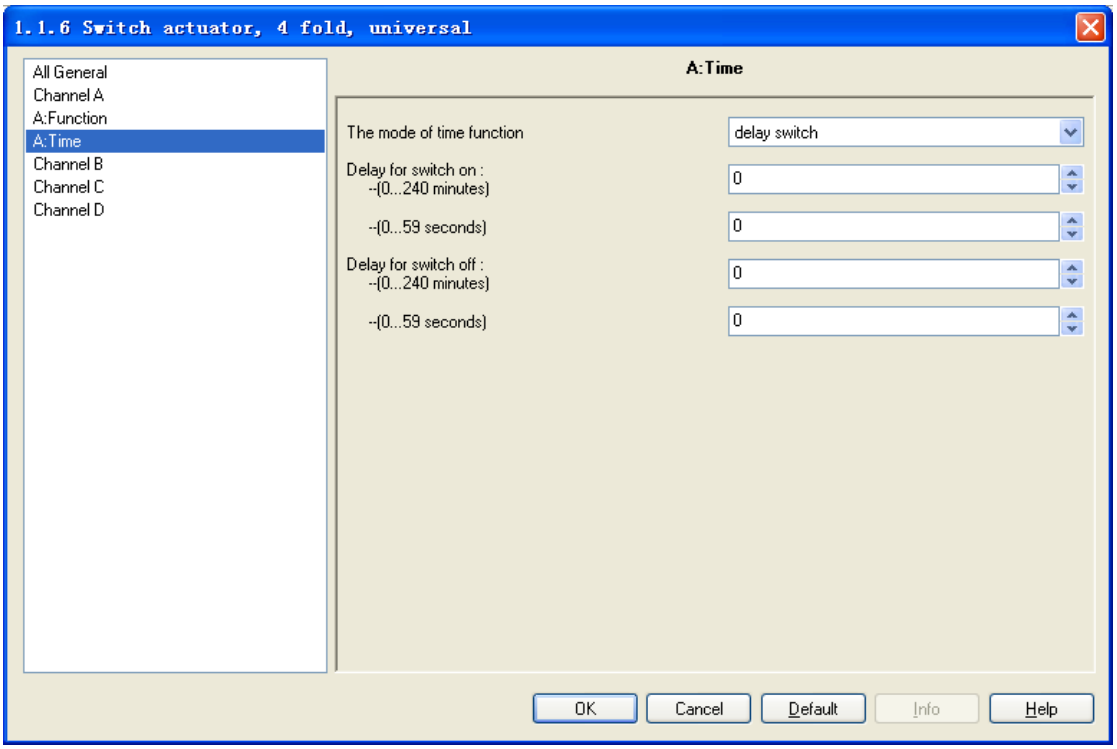

Fig. 2.6 setup window "X: Time"

Parameter "*The Mode Of Time function*"

The parameter defines the type of the timing function setup.

Options: *Delay switch*

Staircase lighting

Flashing

3.3.1.1 Selection "*Delay switch*"

The parameter window of the time function in Fig. 2.6 will be shown when selecting "*Delay switch*".

Parameter "*Delay for switching on: (0...240 minutes)*"

This parameter defines the stating time of the switch delay: minutes

Options: *0…240*

Parameter "*Delay for switching on: (0...59 seconds)*"

This parameter defines the starting time of the switch delay: seconds

Options: *0…59*

Parameter "*Delay for switching off: (0...240 minutes)*"

This parameter defines the closing time of the switch delay: minutes

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Options: *0…240*

Parameter "*Delay for switching off: (0...59 seconds)*"

This parameter defines the closing time of the switch delay: seconds

Options: *0…59*

3.3.1.2 Selection "*Staircase lighting function*"

The parameter window of the staircase lighting function in Fig. 2.7 will be visible when selecting "*Staircase lighting function*" in the parameter "*The mode of time function*".

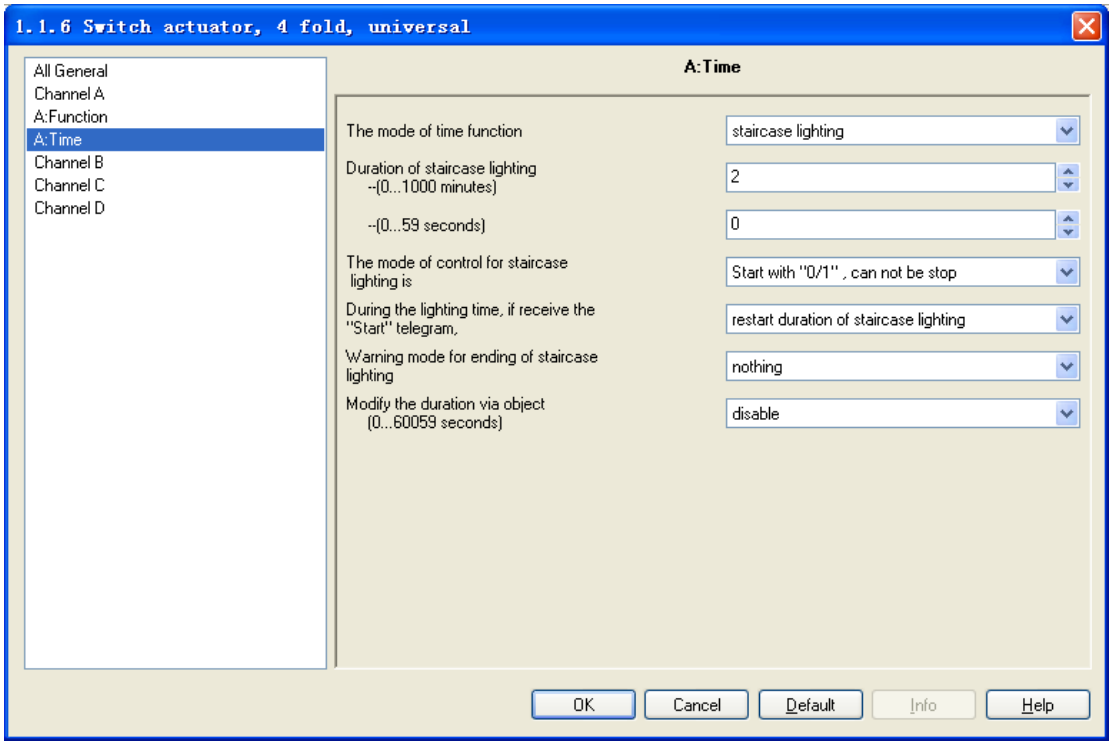

Fig. 2.7 parameter window "X: Time-Staircase lighting"

The staircase lighting function is switched on via the object "*Output of staircase lighting*". And also it is available to program the value of "*Output of staircase lighting*". The staircase lighting time starts when it is switched on and will be switched off immediately after the set time when there is no prealarm setting.

Parameter "*Duration of staircase lighting-(0...1000 minutes)*"

This parameter describes the duration time when switching on the staircase light function: minutes

Options: *0…1000*

Parameter "*Duration of staircase lighting-(0...59 second)*"

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This parameter describes the duration time when switching off the staircase light function: seconds

Options: *0…59*

Note: If the minute is set to "0", and the seconds is set to "0", the staircase lighting will be disabled.

Parameter "*The mode of control for Staircase lighting is*"

This parameter defines the mode of the staircase lighting function.

Options: *Start with "1", stop with "0"*

Start with "1", no action with "0"

Start with "0/1", cannot be stopped

When selecting "*Start with "1", stop with "0"*", it will switch on the staircase lights with the value "*1*" received by the object "*Output of staircase lighting*"; it will stop the time counting operation and don't change the contact position until changed by other operations with "*0*".

When selecting "*Start with "1", no action with "0"*", it will switch on the staircase lights with the value "*1*" received by the object "*Output of staircase lighting*" and no reaction with "*0*".

When selecting "*Start with "0/1", cannot be stopped*", it will switch on the staircase lights either with "*0*" or "*1*" received by the object "*Output of staircase lighting*" but cannot end it by the object.

Parameter "*During the lighting time, if receive the 'start' telegram*"

Options: *restart duration of staircase lighting*

Ignored the "switch on" telegram

It will restart the staircase lights to redo the timing if receive the telegram of the object "*Output of staircase lighting*" when selecting "*restart duration of staircase lighting*" during the staircase lighting; while it will ignore the telegram with "*Ignored the 'switch on' telegram*".

Parameter "*Warning mode for ending of staircase lighting*"

The parameter points out the alarm type when terminating the staircase lights, which will start the prealarm notice before switching off. This prealarm time is not included in the starting duration of the staircase. There will be no alarm if selecting "*nothing*", as well as the lights is off before the prealarm time.

Options: *nothing*

via object

flashing the channel output with OFF/ON

via object & flashing the channel output

2 types of prealarm are provided:

-by the communication object: set the value of the object "*Warning of staircase*" as "*1*" when starting alarming and then send it to the bus;

-by the lights flashing: control the output flashing (a short switch), and the duration is 1 second.

These 2 types can be used independently or together. It will be the type of "by the communication object"

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when it is "*via object*", or the type of "by the lights flashing" with "*flashing the channel output with OFF/ON*"; as well as mixed type with "*via object & flashing the channel output*".

Parameter "*--The warning time for ending of staircase lighting (0…59s)*"

The parameter is visible after selecting a prealarm type, and the duration of the prealarm: second.

Options: *0…59*

Parameter "*Modify the duration via object (0...60059 seconds)*"

It will activate the object "*Duration of staircase*" with 2 bytes when selecting "*Enable*" to modify the staircase lighting time, however it cannot modify the time with "*disable*".

Options: *disable*

Enable

Note: If the values of telegram for modification the duration is "0", the staircase lighting will be disabled.

3.3.1.3 Selection "Flashing"

The parameter window in Fig. 2.8 "*X: Time-flashing switch*" will be shown up when selecting "*flashing switch*" in "*The mode of time function*".

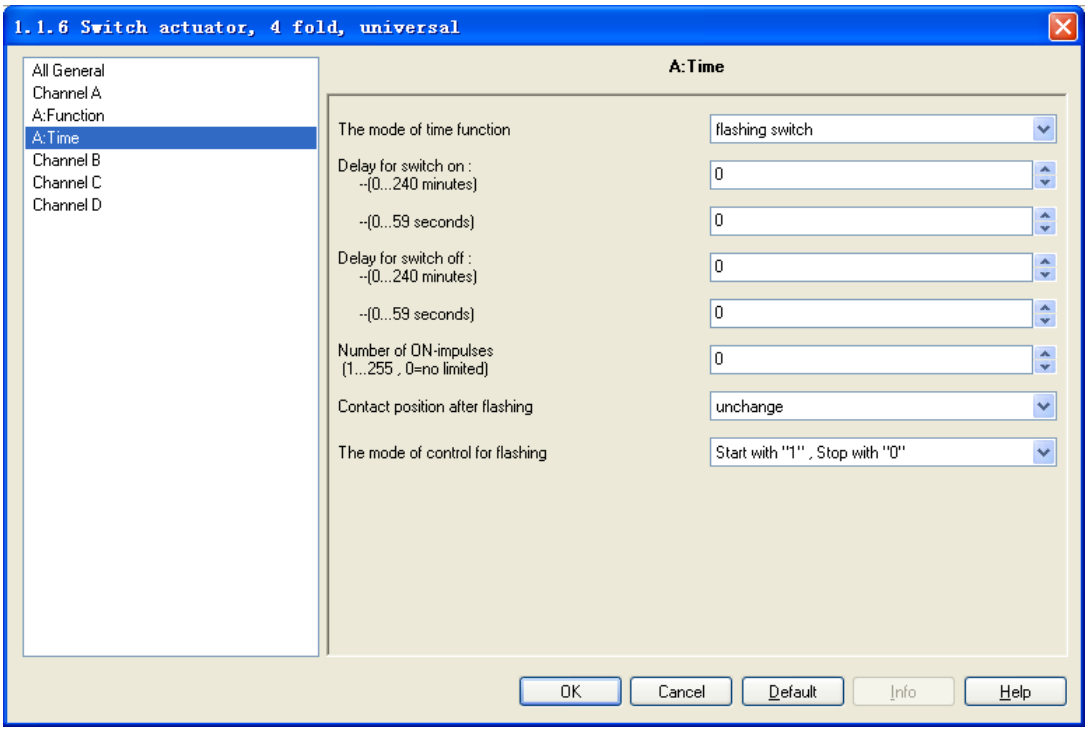

Fig. 2.8 parameter window "X: Time-flashing switch"

It is able to set the flashing time in "*Delay for switch on*" or "*Delay for switch off*", which will restart the flashing when receiving the relevant telegram by the object "*Switch*", and define the contact position after flashing.

Parameter "*Delay for switch ON: Min. (0...65.535), Sec. (1...59)*"

The parameter defines the delayed time to switch on the output when flashing.

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Options: *0…240 minutes*

0...59 seconds

Note: it will not be executed unless the time is lower than the relay threshold switch frequency. Since there will be not sufficient energy to do it because of the frequent relay switching, and it may cause the time delay. The same situation will happen after the bus voltage recovery.

Parameter "*Delay for switch off: Min. (0...65.535), Sec. (1...59)*"

The parameter defines the delayed time to switch off the output when flashing.

Options: *0…240 minutes*

0...59 seconds

Note: it will not be executed unless the time is lower than the relay threshold switch frequency. Since there will be not sufficient energy to do it because of the frequent relay switching, and it may cause time delay. The same situation will happen after the bus voltage recovery.

Parameter "*Number of ON-impulses (1...255，0=no limited)*"

This parameter points out the flashing times.

Options: *0...255*

Note: 0 means no limited!

Parameter "*Contact position after flashing*"

This parameter points out the relay contact position after flashing.

Options: *unchange*

Open

Close

Parameter "*The mode of control flashing*"

The parameter states the mode of the flashing output.

Options: *star with"1",stop with "0"*

star with "0",stop with "1"

star with "1/0", can not be stopped

It will start flashing with "*1*" received by the object "*Switch*" when selecting "*star with '1', stop with '0'*"; it will stop flashing with "0".

It will start flashing with "*0*" received by the object "*Switch*" when selecting "*star with '0', stop with '1'*"; it will stop flashing with "*1*".

It will start flashing with either "*1*" or "*0*" received by the object "*Switch*" when selecting "*star with '1/0'，can not be stopped*"; Under this circumstance it cannot terminate the flashing by sending the telegram until the preset ending time.

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3.3.2 Parameter window "X: Preset"

This parameter window in Fig. 2.9 will burst out when selecting "*enable*" in the parameter "*Function of 'preset' for switch is*".

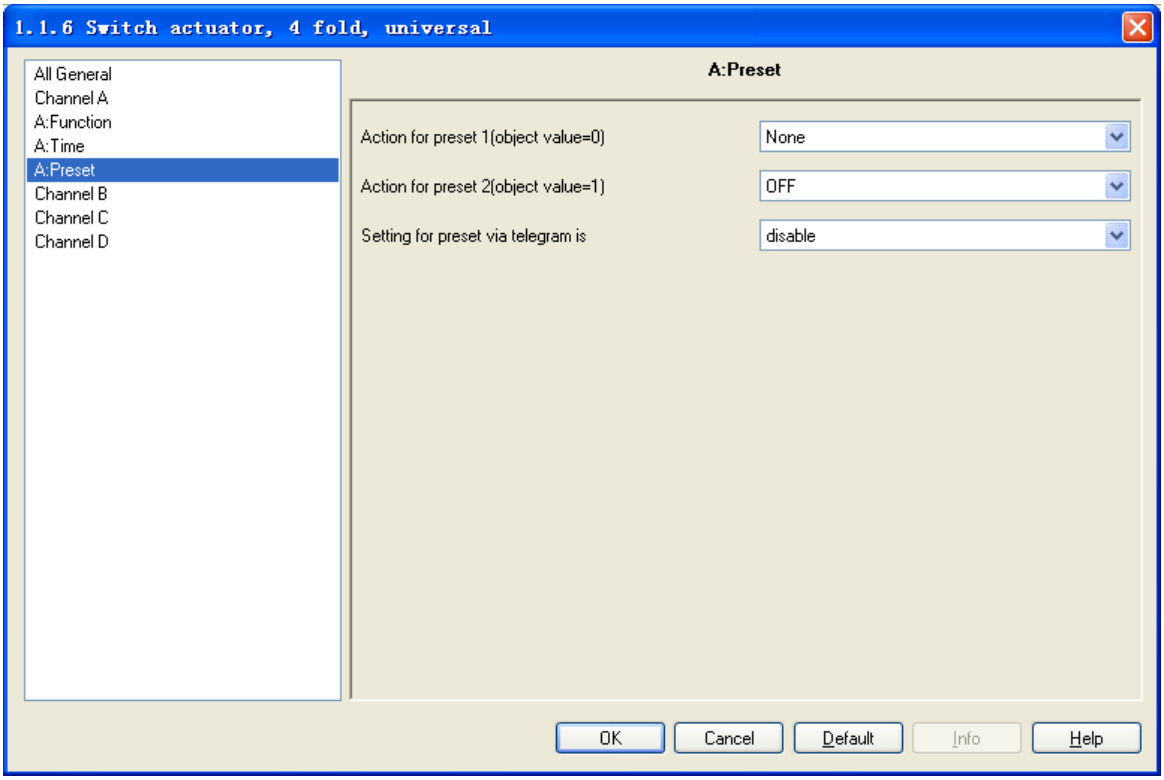

Fig. 2.9 setup window "X: Preset"

It is able to not only invocate the preset value, but also save the new value of the current switch status by the bus.

There are 2 objects to invocate and save the preset value, and 2 optional preset values (preset 1 and preset 2). It means "*preset 1*" with "*0*", and "*preset 2*" with "*1*".

Parameter "*Action for preset 1 (object value=0)*"

This parameter defines the relay status when invocating the preset value 1 (that is when the object "*Call preset 1/2*" receives the telegram "*0*") by setting the communication object "*Call preset 1/2*".

Options: *None*

ON

Off

Parameter "*Action for preset2 (object value=1)*"

This parameter defines the relay status when invocating the preset value 2 ((that is when the object "*Call preset 1/2*" receives the telegram "*1*") by setting the communication object "*Call preset 1/2*".

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Options: *ON*

OFF

Last position of contact

Setting of preset 1

When the action trigged by Preset 2 selects "*last position of contact*", it will be recovered to the last switch status every time recalling preset 2.

When the action trigged by Preset 2 selects "*setting of preset 1*", it will carry out the set parameters of the action trigged by preset 1 every time recalling preset 2.

Parameter "*Setting for preset via telegram is*"

It is used to set whether changing the preset value by the bus. It is allowable to change the value and enable the object "*Set preset 1/2*" at the same time when selecting "*enable*", which can save the current status as the new preset value. The current value is saved as new preset 1 when receiving the telegram "*0*"; as new preset 2 when "*1*". The current status will be saved in the new preset value if selecting "*None*" in "*Action for preset 1 (object value 0)*" and "*Last value of channel*" or "*restore parameterized value of preset 1*" in "Action for *preset2 (object value 1)*".

Options: *enable*

Disable

Note: it will save the new preset value after bus voltage recovery.

3.3.3 Parameter window "X: Logic"

It will show up Fig. 2.10 when selecting "*enable*" in "*Function of 'logic' for switch is*" in Fig. 2.5.

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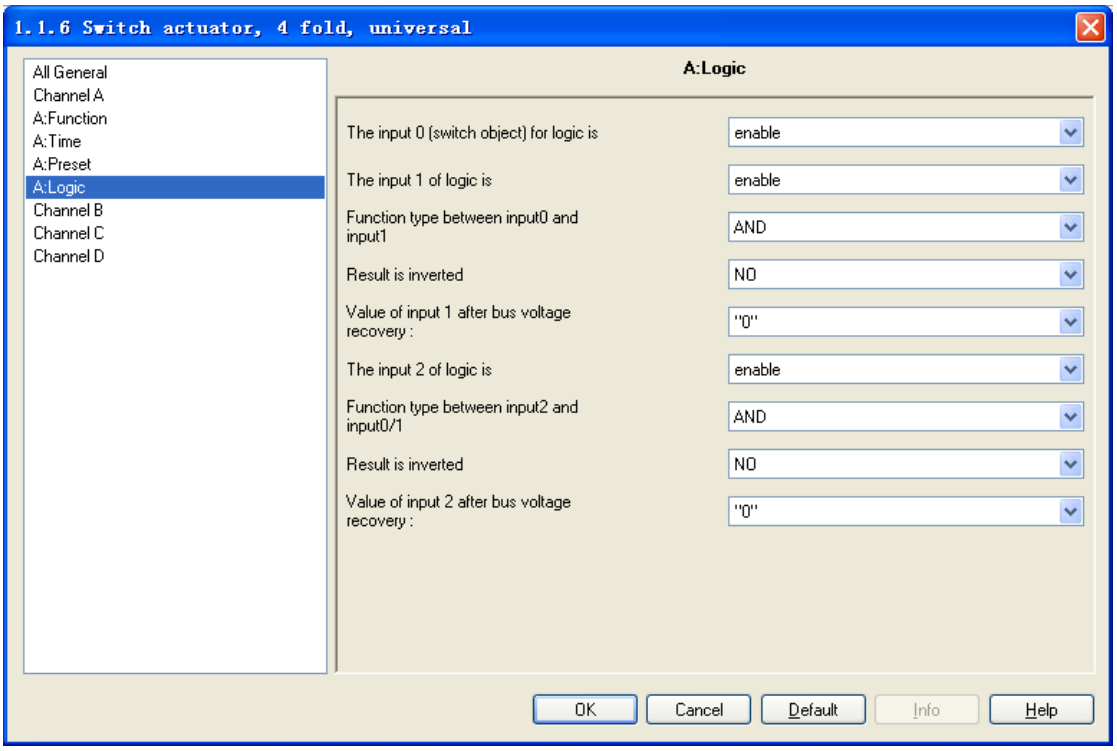

Fig. 2.10 setup window "X: Logic"

There are 2 logic communication objects to decide the status of individual output, which are related to the "*Switch, X*".

It will re-operate when receiving a new object value as the final output status (close the contact with "*1*", open it with "*0*"). The values of the communication object "*Input 1 of logic*" makes logic operation with "*Switch, X*" firstly, and then the result after that will makes operations with the value of "*Input 2 of logic*". This operation will ignore the objects which are unable, and continue to the next step with the ones who are enabled.

Parameter "*The input 0 (switch object) for logic is*"

This parameter is used to enable the function of logic operation of "*input 0*", whose values are wrote by the object "*Switch, X*".

Options: *disable*

Enable

Parameter "*The input x of Logical" (x = 1, 2)*"

This parameter describes the status of the logic operation of the object "*Input 1 of logic*" or "*Input 2 of logic*".

Options: *disable*

Enable

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Parameter "*Function type between input 0 and input 1/（input 2 and input 0/1）*"

This parameter introduces the logical relationship of the logic operation, providing 3 standard logical operations (AND, OR, XOR) and a gate function.

Explanation of gate function: it will use the previous logic value as the enable mark of the next logic. If the enable mark of the previous logic is "*1*", that means it is able to use the next logic value as the operation result. E.g. the value of input 0 is 1, that means the value of input 1 can be used as the operation result; if the value of input 1 is 1, that means the value of input 2 can be used as the result too.

Options: *AND*

OR

XOR

Gate function

Parameter "*Result is inverted*"

This parameter defines whether negate the logical operation results. Negate it with "*yes*", don't with "*no*".

Options: *no*

yes

Parameter "*Value of input 1 after bus voltage recovery*"

This parameter defines the default value of the object "*Input x of logic (x=1, 2)*" after bus voltage recovery.

Options: *0*

1

Value before power off

The value will be the one before power off after bus voltage recovery when selecting "*value before power off*".

Parameter "*Value of input 2 after bus voltage recovery*"

This parameter defines the default value of the object "*Input x of logic (x=1, 2)*" after bus voltage recovery.

Options: *0*

1

Unchange

The default logic value is unsure when selecting "*Unchange*".

3.3.4 Parameter window "X: Scene"

The parameter window shown in Fig. 2.11 will burst out when selecting "*enable*" in "*Function of 'scene' for switch is*" in Fig. 2.5.

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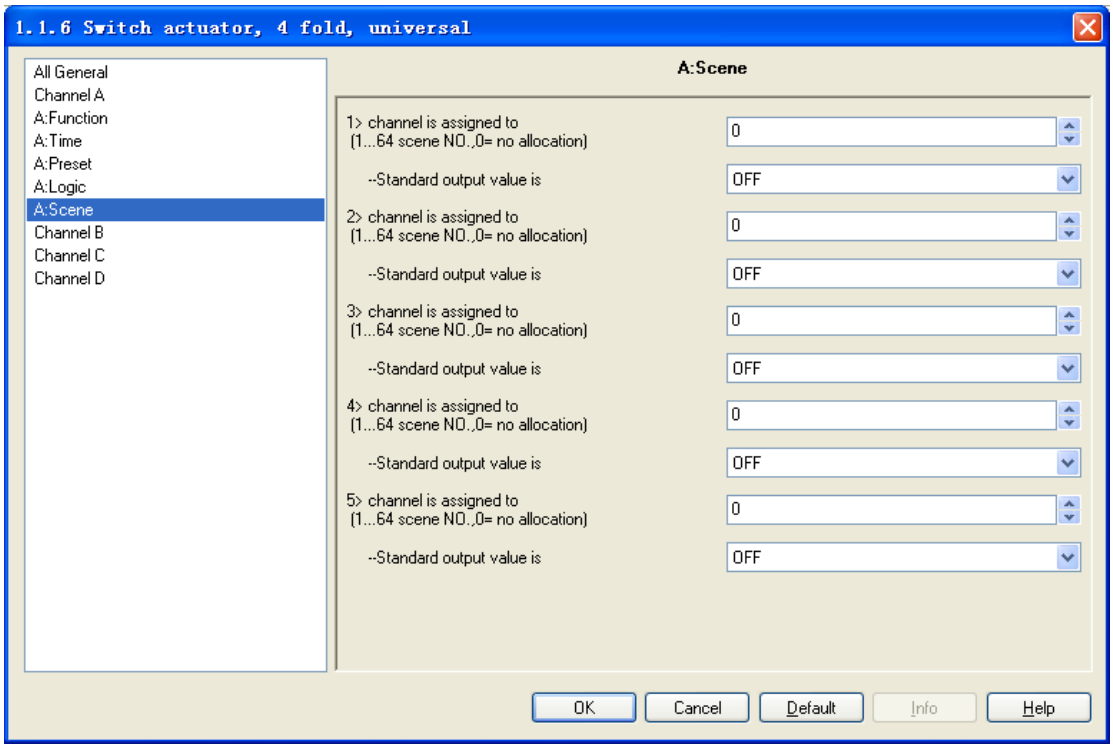

Fig. 2.11 parameter window "X: Scene"

Parameter "*channel is assigned to (1...64 scene NO., 0=no allocation)*"

It is able to allocate 64 different scene numbers to every output. There are 5 various scenes can be set per output.

Options: *Scene 1...Scene 64, 0=no allocation;*

Parameter "*--Standard output value is*"

This parameter defines the switch output status when invocating the scene.

Options: *ON*

OFF

3.3.5 Parameter "X: Threshold"

The window in Fig. 2.12 will be shown up when selecting "*enable*" in the parameter "*Function of 'threshold' for switch is*" in Fig. 2.5.

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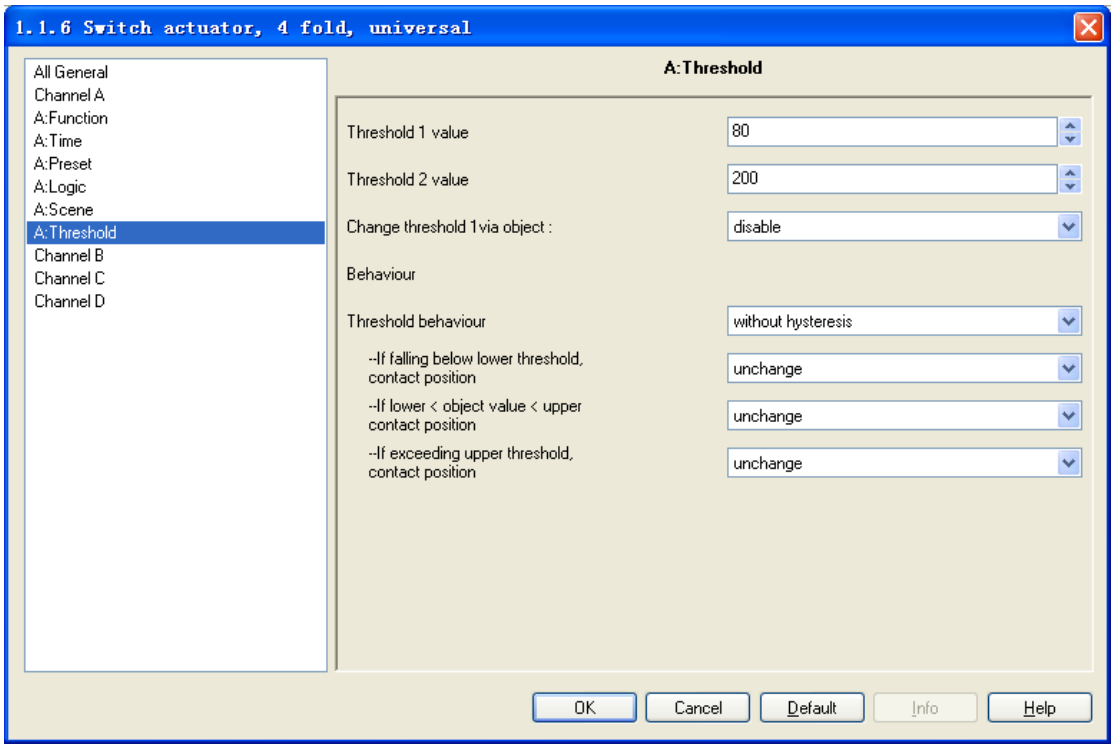

Fig. 2.12 setup window "X: Threshold"

The object "*Threshold input*" of 1Byte is enabled when activating the threshold function. It will trigger the switch to make one operation if the value of the object "*Threshold input*" is lower or more than the default threshold. There are 2 individual thresholds are ready to use always and the "*threshold 1 value*" is set by the bus.

Parameter "*Threshold 1 value*" / "*Threshold 2 value*"

This parameter defines the value of threshold 1 and threshold 2.

Options: *0...255, for threshold 1*

0...255, for threshold 2

Parameter "*Change threshold 1 via object:*"

This parameter defines whether change the threshold value by bus or not.

Options: *disable*

enable

It is able to start the object "*Change Threshold value 1*" by selecting "*enable*", and change the threshold 1 value by the bus; on the other hand, it cannot change the value with "*disable*". However it is not allowable to change the "*threshold 2 value*" by the bus.

Parameter "*Threshold behaviour*"

The parameter defines the delay status of "*threshold 1 value*" and "*threshold 2 value*".

Option: *without hysteresis*

with hysteresis

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The delay can avoid the unnecessary behaviour caused by the input value if its value is between 2 threshold values.

Parameter "*If falling below lower threshold, contact position*", "*If exceeding upper threshold contact position*"

These parameters will be seen with "*with hysteresis*" in the parameter "*Threshold behavior*", which defines the action when the value of the object "*Threshold input*" is lower than the lowest threshold value or higher than the highest value.

Options: *Unchange*

Open

Close

Parameter "*If falling below lower threshold, contact position*", "*If exceeding upper threshold contact position*", "*If lower < object value < upper， contact position*"

These parameters are visible with "*without hysteresis*" in the parameter "*Threshold behavior*", which defines the relay action in the object "*Threshold input*".

Options: *Unchange*

Open

Close

3.3.6 Parameter window "X: Safety"

The window shown in Fig. 2.13 will be seen when selecting "*enable*" in the parameter "*Function of 'safety' for switch is*" in Fig. 2.5.

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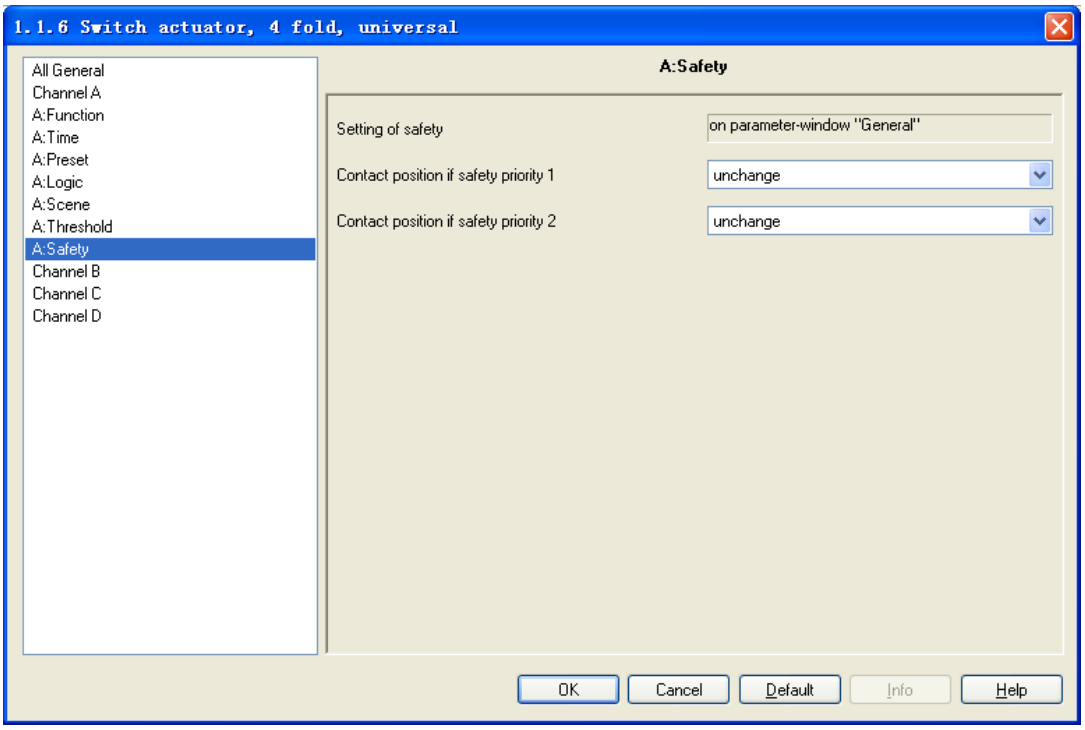

Fig. 2.13 setup window "X: Safety

Enable 2 "*Safety Priority*" (x=1, 2) in the parameter window "*All General*", which define the relay's contact position for every output individually. There are 2 safety priorities for every output and also the "*Safety Priority 2*" is prior to "*Safety Priority 1*". It means when these 2 priorities are triggered at the same time, the contact position will follow the setup of "*Safety Priority 2*".

Note: the contact position will not be changed if the "Safety" function is disabled while the "Safety priority X" is triggered (setting in the parameter window "*All General*")

Parameter "*Contact position if Safety Priority x*" (x=1, 2)

It defines the contact position after triggering "*Safety Priority x*" (x=1, 2).

Options: *Unchange*

Open

Close

3.3.7 Parameter window "X: Forced"

The window of the function "*forced*" in Fig. 2.14 will be visible with "*enable*" in the parameter "*Function of 'forced' for switch is*" in Fig. 2.5.

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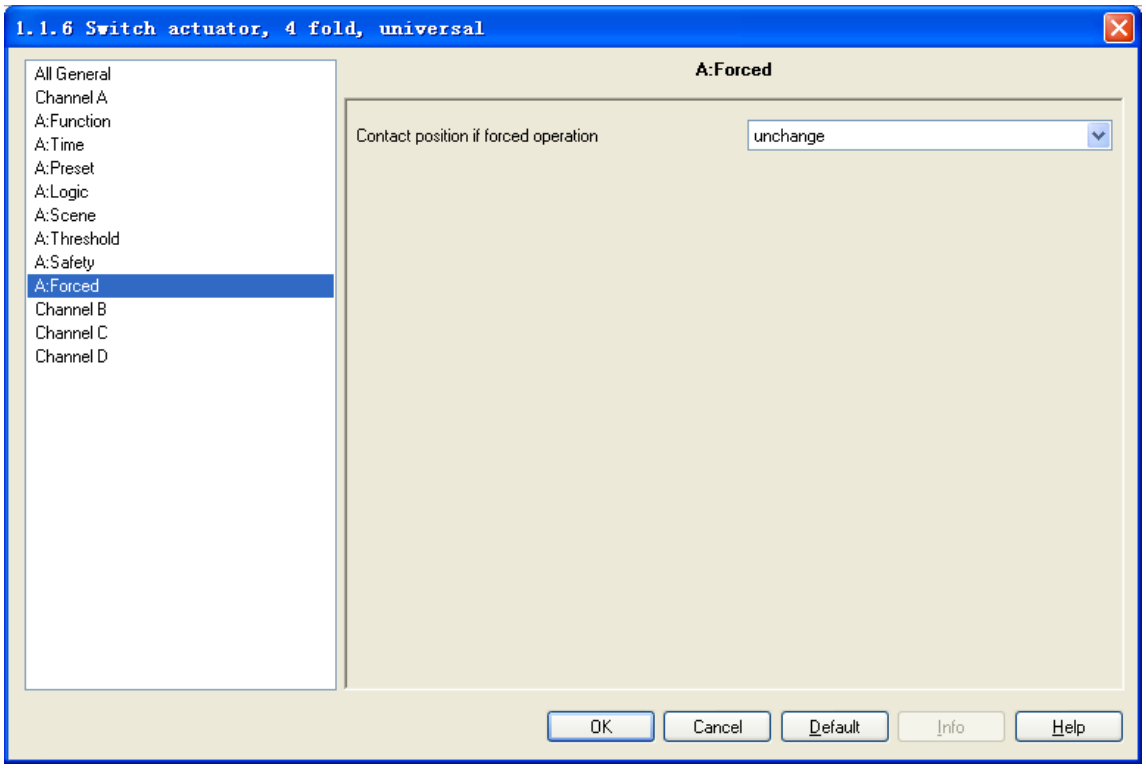

Fig. 2.14 setup window "X: Forced"

This function will be used in some special situation such as emergency, and are activated by the object "*Forced output*" with the highest priority in the system, which means only "*forced operation*" are valid in this case.

Parameter "*Contact position if forced operation*"

This parameter defines the contact position of the "*forced operation*".

Options: *Unchange*

Open

Close

3.4 Parameter window "Channel X"-Dynamic regulating Actuator

The window of "*Channel X-Dynamic regulating Actuator*" in Fig. 2.15 will be visible with "*Dynamic regulating Actuator*" in "*Channel X work mode is*".

In the running mode of "*Dynamic regulating Actuator*", it is used to control the solenoid valves by a thermostatic controller or temperature sensor to realize the temperature constancy in the room.

There are 2 options of control mode for every output: 1 bit control and 1 byte control. Under the 1bit mode, it will receive 1 bit command by the communication object "*on-off of regulating*"; under the 1byte mode, it will receive 1 byte command by the communication object "*continuous of regulating*".

"*0*" means the valve is off, while "*100%*" is on. And 0~100% means during a cycle period, the valve will be

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on for x% of the period while off for the rest time.

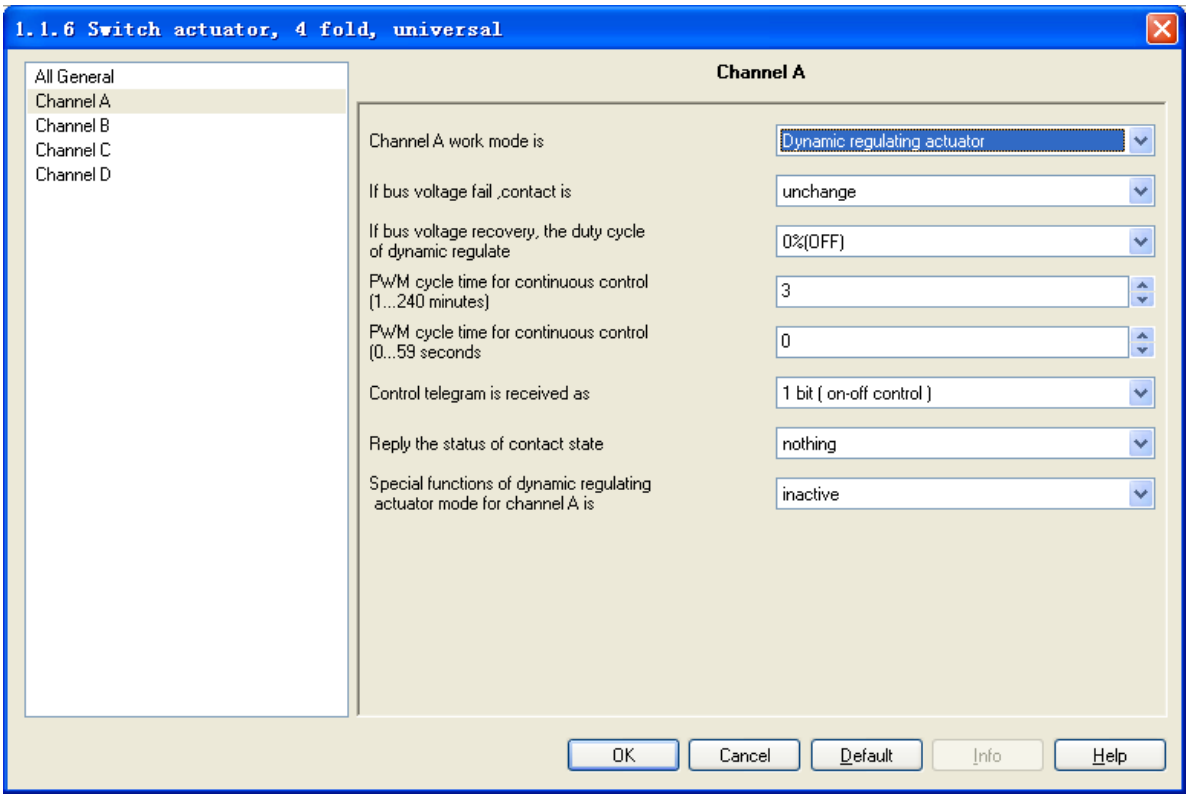

Fig. 2.15 setup window "channel: X-Dynamic regulating Actuator"

Parameter "*If bus voltage fail, contact is*"

This parameter defines the contact position when the bus power off.

Options: *Unchange*

Close

Open

The above setting will be valid only when the relay has sufficient energy after the bus voltage off.

Parameter "*If bus voltage recovery, the duty cycle of dynamic regulate*"

This parameter defines the status of the switch actuator when the bus power is on, which will last until receiving the control command or into a failure mode.

Options: *0%.(OFF)*

10% (26)

…

100% (ON)

Parameter "*PWM cycle time for continuous control minutes (1...240 minutes)*" and "*PWM cycle time for continuous control seconds (0...59 seconds)*"

It is able to set the period of the pulse width control (PWM) in this parameter, and whose unit is minute and

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second.

Options: *0...59 seconds*

1...240 minutes

Note: it is suggestive to set longer period in the parameter to protect the relays and the controlled devices.

Under the 1bit control mode, the pulse width control (PWM) is only valid in the malfunction, force operation mode, safe operation mode and after voltage recovery.

Parameter "*Control telegram is received as*"

This parameter defines the control mode of the output as a dynamic regulating actuator.

Options: *1 bit (on-off control)*

1 byte (continuous)

In the control mode of "*1bit*", the function of the dynamic regulating actuator is as the same as the common switch actuator: the thermostatic room controller control the output by the common switch command. When the controller goes out of order and the relay receives no control signal, the relay will action automatically by using PWM with duty cycle of 50%.

In the control mode of "*1 byte*", the sending value of the room thermostatic controller is from 0 to 255 (corresponding from 0% to 100%), which is so called "*continuous-action control*". 0% means switch off the valve, and 100% to switch it on. It will adjust the output control by the duty cycle of the pulse.

Note: in the function of dynamic regulating actuator, it will recalculate the duty factor of the pulse every time receiving the telegram of continuous regulating. And it will recalculate the time by switching the contact to the opposite position.

Parameter "*reply the status of channel for continuous control*"

It is visible when selecting "*1 byte (continuous)*" in the parameter "*Control telegram is received as*", which is used to report the status of the controlled valve gate, with 2 options according to the type of the controlled devices: 1 bit and 1 Byte.

Options: *nothing*

yes, 0% ="0", otherwise "1"(1 bit)

yes, 0% ="1", otherwise "0"(1 bit)

yes, continuous control value (1 byte)

Parameter "*Reply the status of contact state*"

It will send the switch status out when receiving the telegram that the channel status is read by other devices.

Options: *nothing*

Yes, "1"=contact close, "0"=contact open

Yes, "0"=contact close, "1"=contact open

Under the selecting of "*Yes, '1'=contact close, '0'=contact open*", when there is some request from other devices, the object "*Reply status of contact*" will send "*1*" to other devices if the contact is closed; While if it is

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open, it will send "0" to the other devices.

It is quite the contrary when selecting "*Yes, '0'=contact close, '1'=contact open*".

3.4.1 Parameter window "X: Function"-Dynamic regulating Actuator

This window in Fig. 2.16 will pop out when selecting "*active*" in the parameter "*Special functions of dynamic regulating actuator mode for channel X is*", and it decides whether enable the function of dynamic regulating actuator.

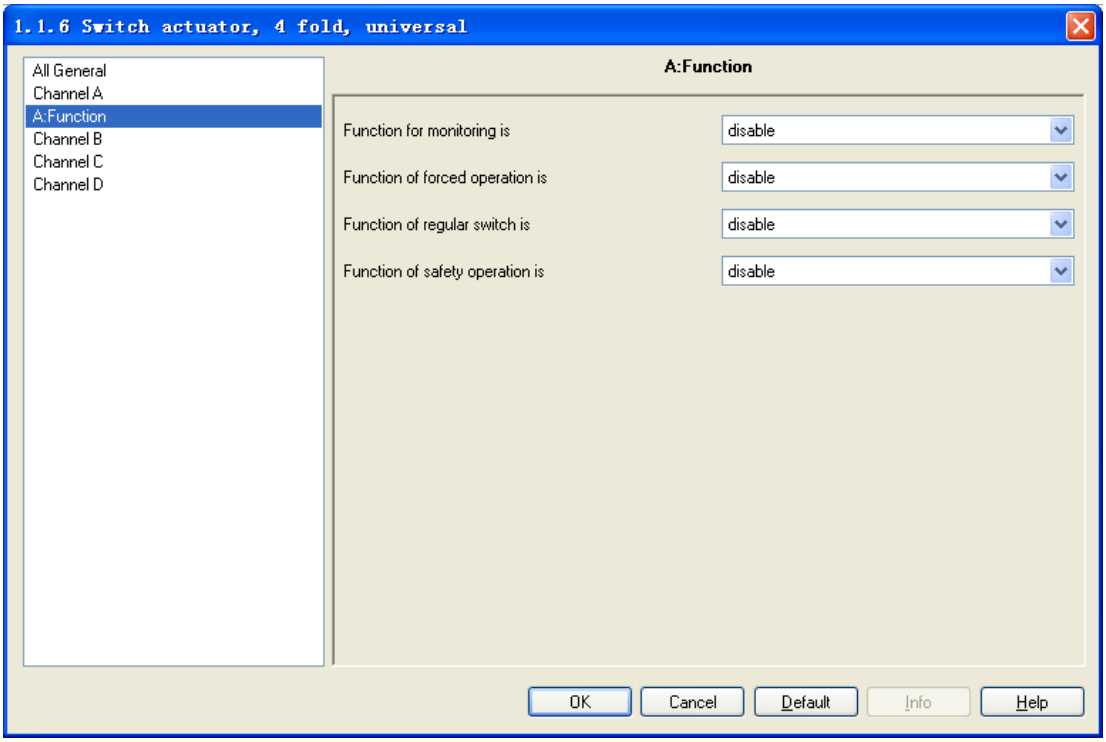

Fig. 2.16 setup window "X: Function"

Parameter "*function for monitoring is*", "*function of forced operation is*", "*function of regular switch is*", "function of safety operation is"

Options: *enable*

disable

The relevant setup interface will appear when selecting "*enable*".

3.4.2 Parameter window "X: Monitoring"

The monitor function in Fig. 2.17 "*X: Monitoring*" will be shown when selecting "*enable*" in the function "*function for monitoring is*".

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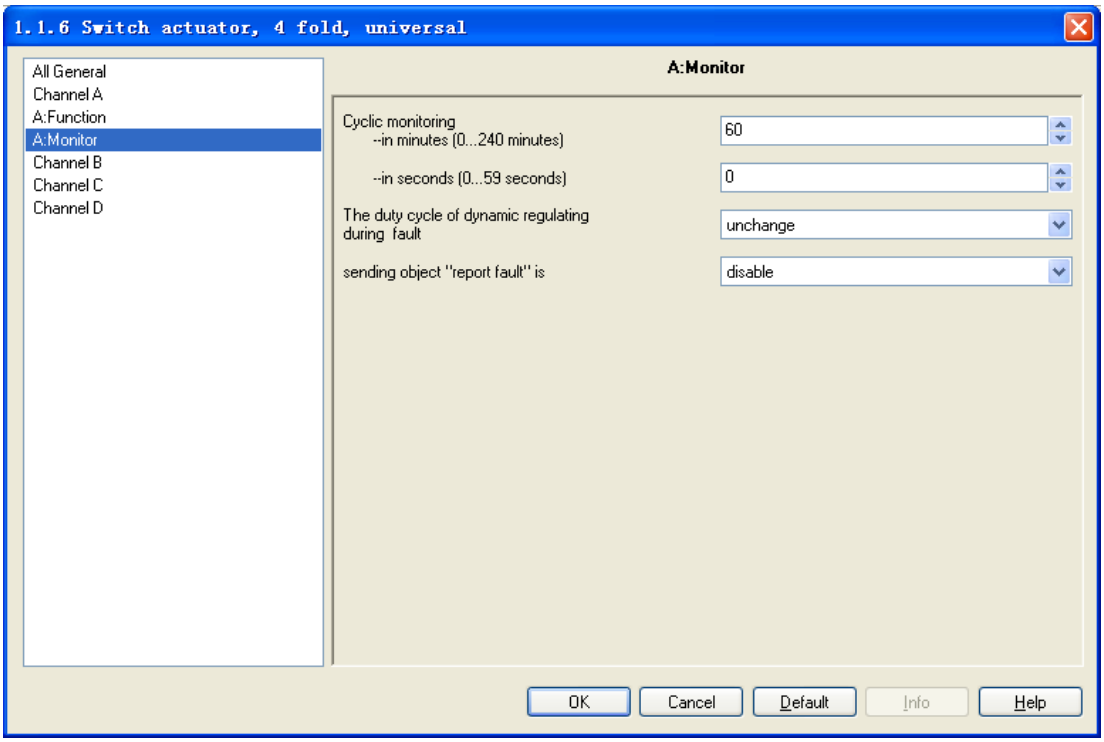

Fig. 2.17 parameter window "X: Monitoring"

Parameter "*Cyclic monitoring---in minutes (0...240 minutes)*

***---in seconds (0...59 seconds)*"**

This parameter defines the time that the relay monitors the telegram. Generally speaking, the room thermostatic controller will send the control telegram to the bus in a certain time. If the bus cannot receive the telegram in that time, it will be judged that the controller goes out of order. During the set time, the bus cannot receive the telegram for the controller; the relay will start the failure mode automatically until receiving a new telegram. The monitor time will be recounted when receiving a new control telegram.

Options: *0...240 minutes*

0...59 seconds

Note: if the function is activated, the controller must send the telegram periodically out, and the monitoring time must be longer than the internal time of the control telegram.

Parameter "*The duty cycle of dynamic regulating during fault*"

This parameter defines the duty cycle of the PWM under the failure mode, that is the dynamic action under the failure mode.

Options: *Unchange*

0 % (OFF)

10 % (26)

...

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90 % (230)

100 % (ON)

Explanation of the option "*Unchange*": the dynamic action of PWM remains the same as before.

Parameter "*sending object 'report fault' is*"

This parameter defines whether to send the report out in the failure mode. When enabling it, it will send the failure report out if there is no action during the monitoring time and then carry out the dynamic action under the failure mode until it is interrupted by other operation. It will restart the timing when carrying out the new action.

Options: *disable*

enable

The object "*report fault*" will be activated when selecting "*enable*". The relay will be in the failure mode with "*1*", while not with "*0*".

Note: it will not send the report out with non-low-priority level. And monitor belongs to the low-priority level.

3.4.3 Parameter window "X: Forced"

The function "*X: Forced*" in Fig. 2.18 will be visible if selecting "*enable*" in the function "*function for forced is*".

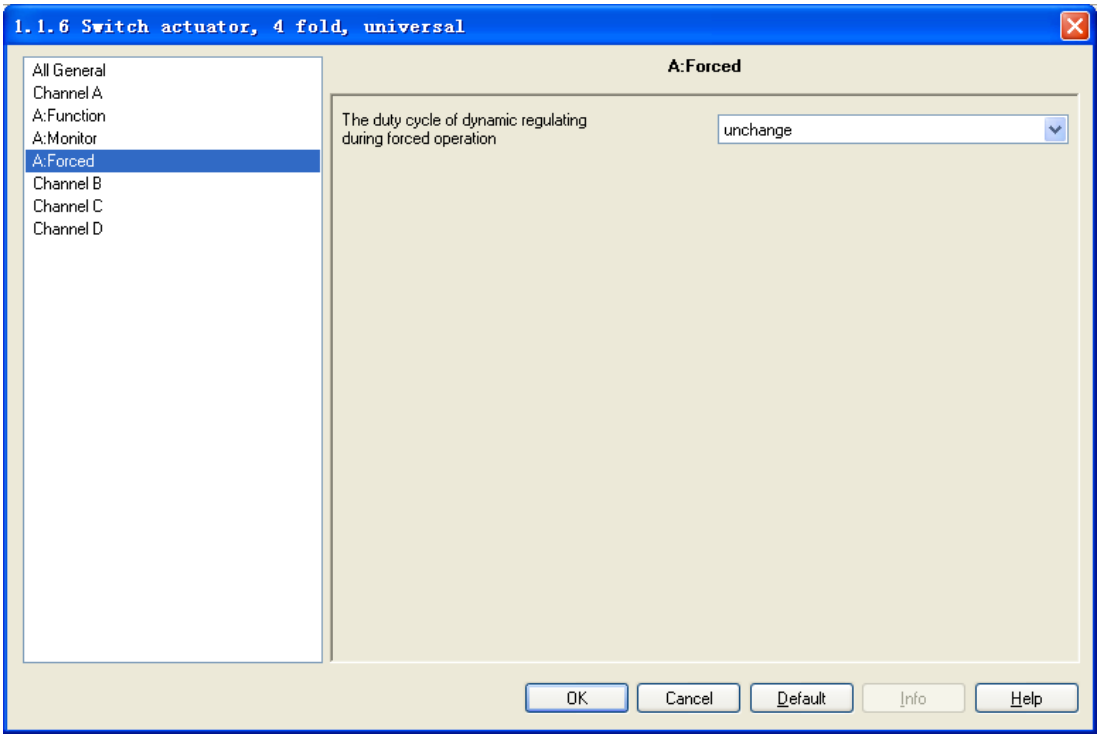

Fig. 2.18 parameter window "X: Forced"

In this mode, the output will be forced to switch to the set position, and it has the highest priority. The other operations will be ignored in this forced mode, which will be activated when the object "*forced operation,*

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regulating"=1 and ends with *0.*

Parameter "*The duty cycle of dynamic regulating during forced operation*"

This parameter defines the value of PWM in forced mode.

Options: *Unchange*

0 % (OFF)

10 % (26)

...

90 % (230)

100 % (ON)

It will not change the PWM action of the forced operation with "*Unchange*", that is the duty cycle of PWM will retain the same current value.

When it is going back to the normal operation mode from the forced mode that is the forced mode is finished, the relay will carry out the same dynamic action as in the forced mode until it is change by the other operation.

3.4.4 Parameter window "X: Regular"

The window of "*X: Regular*" in 2.19 will pot out when selecting "*enable*" in the parameter "*function for regular switch is*".

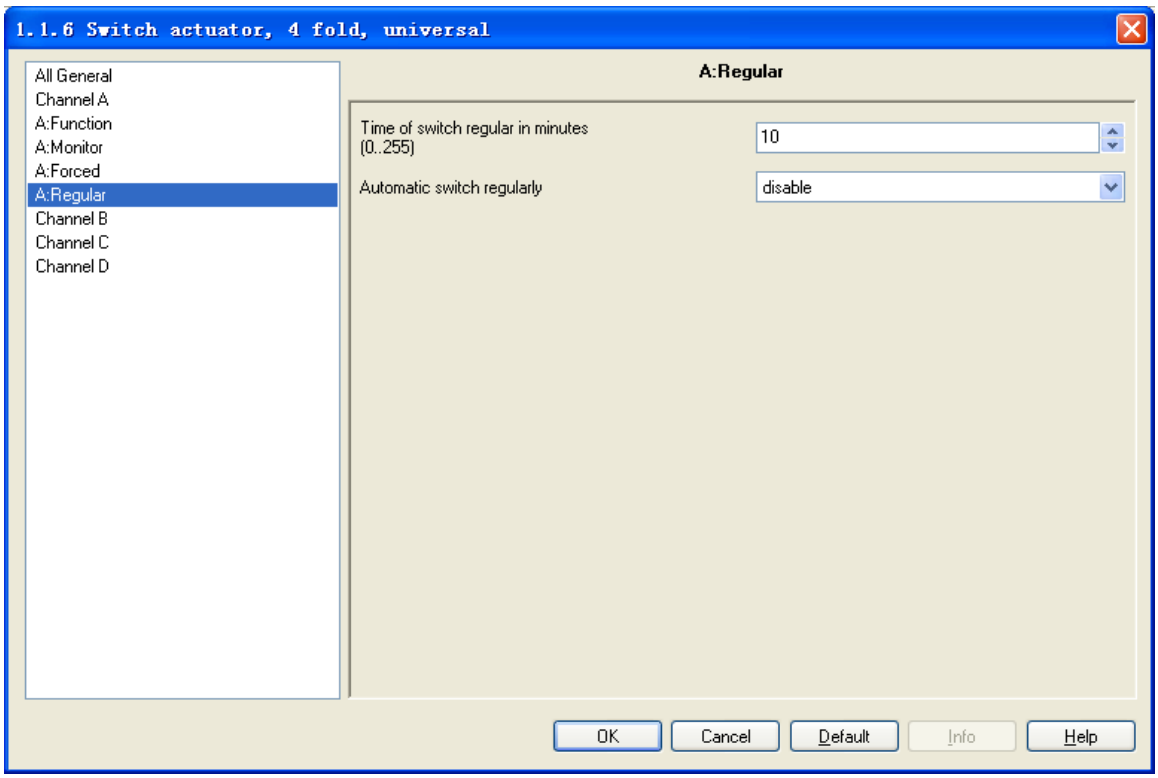

Fig. 2.19 parameter window "X: Regular"

This function can be used to avoid the device's malfunction because of the dust deposits in the valve area, which plays a very important role when in the long Unchange switch status. This function can be started by the

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object "*Trigger switch regularly*" or internally.

Parameter "*Time of switch regular in minutes (0...255)*"

This parameter defines the time span when the regular switch carry out one action, and whose unit is minute.

Options: *0...255*

Parameter "*Automatic switch regularly*"

This parameter defines the time interval of starting the automatic regular switching.

Options: *disable*

one times per day

one times per week

one times per month

It will start the time counting of the automatic regular switch function if there is no operation on the relays, and recount as long as the relays have operation.

3.4.5 Parameter window "X: Safety"

The parameter window "*X: Safety*" in Fig. 2.20 will pop out when selecting "enable" in the parameter "*function of safety operation is*" in Fig. 2.16.

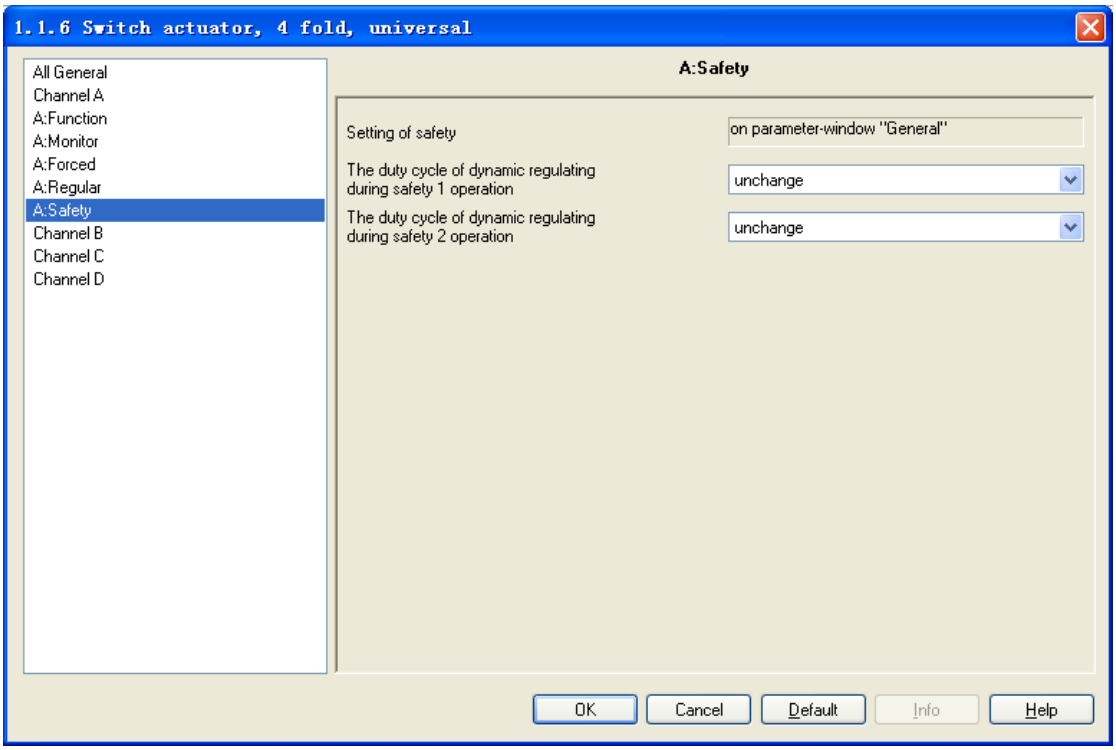

Fig. 2.20 Parameter window "X: Safety"

There are 2 "*Safety Priority x*" (x=1,2) in the parameter window "All General". The parameter defines the dynamic action of the triggered relay per output. There are 2 individual "*Safety Priority x*" (x=1,2) for every output, and "*Safety Priority 2*" is prior to "*Safety Priority 1*". That is even if "*Safety Priority 1*" is triggered at the

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same time with "*Safety Priority 2*", the contact position will follow the instruction of "*Safety Priority 2*". The priority of the safe operation function is only lower to the forced operation function in the system.

Parameter "*The duty cycle of dynamic regulating during safety X operation*" (x=1,2)

This parameter defines the duty cycle of PWM in the safe operation mode.

Options: *0 % (ON)*

10 %(26)

...

90 %(230)

100% (OFF)

Unchange

Explanation of the option "*Unchange*": It will stay the same dynamic action of the PWM when carrying out the safe mode, that is the duty cycle of PWM remains current status.

During the monitoring time of safe mode (can be set in the parameter window Fig. 2.2), it will restart to count the time from the second cycle when it is interrupted by force. And then enter into the safe operation mode after the safe operation monitoring time in this cycle.

When it is going back to the normal operation mode from the safe operation mode (that is the safe operation mode finishes), the relay will keep the dynamic action under the safe operation, that is the duty cycle of PWM stays the same until interrupted by other operations.

3.5 Communication object "Switch Actuator"

The communication object is a media that the bus talks to the other devices, that means only communication object can have the right to communicate to the bus. More details will be described below.

3.5.1 Communication object "All General"

There are 3 objects in "*All General*", which plays important role in the regular switch actuator and the dynamic regulating switch. See in Fig. 2.21 and functions are shown in Table 2.1.

	Object name	no.	C	R	W	T	U	Group addresses	Function	Type
→	General	0	✓	✓		✓			In operation	1 Bit
←	General	1	✓		✓		✓		safety priority 1	1 Bit
←	General	2	✓		✓		✓		safety priority 2	1 Bit

Fig. 2.21 communication object "All General"

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Note: "C" in "Flag" column in the below table means that the object has a normal link to the bus; "W" means the object value can be modified via the bus; "R" means the value of the object can be read via the bus; "T" means that a telegram is transmitted when the object value has been modified; "U" means that value response telegrams are interpreted as a write command, the value of the object is updated.

No.	Function	Object name	Data type	Flags
0	**In operation**	**General**	**1bit**	**C,R,T**
This object is always enabled, used to send telegram "*1*" to the bus periodically to proof the device is under normal working condition.				
1	**Safety Priority 1**	**General**	**1bit**	**W,C,U**
It is able to receive the 1bit telegram from the other devices (such as sensors and controllers and so on) and modify the running condition of the other devices by this object. The other devices will be judged as malfunction if this object doesn't receive the relevant telegram for a certain time (which will be defined in the window "*All General*"), and then it will trigger the set action of "*Safety Priority 1*" in "*X: Safety*". The priority of "*Safety Priority 1*" is lower only to "*Forced operation*" and "*Safety Priority 2*"				
2	**Safety Priority 2**	**General**	**1bit**	**W,C,U**
This object has the same function as "*Safety Priority 1*", but its priority level is secondary only to "*force*".				

Table2.1 communication object table "All General"

3.5.2 General communication object "Switch Actuator"

	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U	Parent value
	send the switch status ,channel A	3	send the switch status, A	1 Bit	Low			✓	✓		
	Communication object	**Number**	**Function**	**Object Type**	**Priority**	**R**	**W**	**C**	**T**	**U**	**Parent value**
	reply the switch status ,channel A	3	reply the switch status, A	1 Bit	Low	✓		✓			
	Communication object	**Number**	**Function**	**Object Type**	**Priority**	**R**	**W**	**C**	**T**	**U**	**Parent value**
	Output A	4	Switch actuator, A	1 Bit	Low		✓	✓			

Fig. 2.22 general communication object per output

No.	Function	Object name	Date byte	Flags
3	**send the switch status, X**	**Output X**	**1bit**	**C,T**
This object will be enabled when selecting "*Transmit after change*" in the parameter "*Set the reply mode of switch status for channel X*", which will indicate the contact status (details will be defined by parameter "*Object value of switch status*" in "*Channel X*").				

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3	**reply the switch status, X**	**Output X**	**1bit**	**R,C,T**
This object will be enabled when selecting "*always respond, after read only*" in the parameter "*Set the reply mode of switch status for channel X*", which will indicate the contact status (details will be defined by parameter "*Object value of switch status*" in "*Channel X*").				
4	**Switch, X**	**Output X**	**1bit**	**W,C**
This object is used to trigger the switch operation. It will start the switch operation with "*1*", and end with "*0*". When enabling "*input 0*" in the logic function, the object "*Switch, X*" is used to modify the logic value of "*input 0*", rather than trigger the switch operation.				

Table 2.2 general communication table per output

3.5.3 Timing function communication object "Switch Actuator"

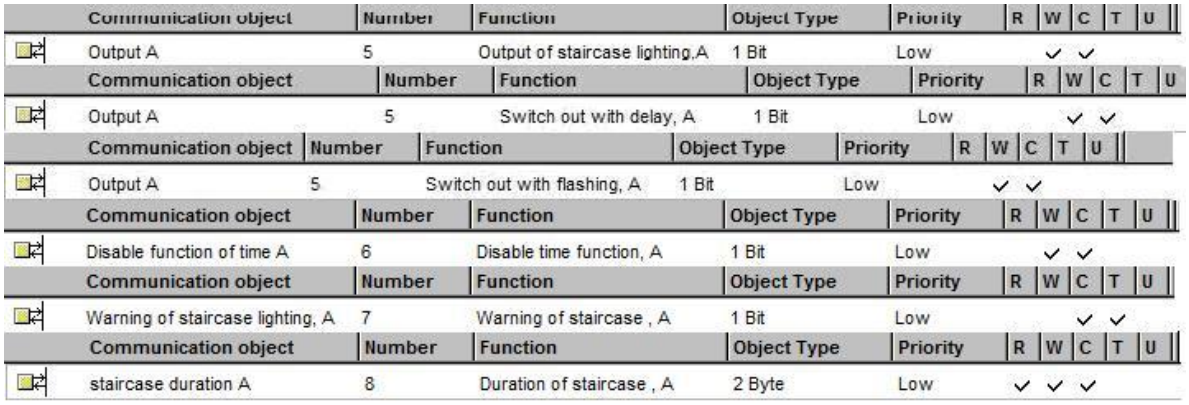

Fig. 2.23 "Switch Actuator" timing communication object for every output

No.	Function	Object name	Data type	Flags
5	**Output of staircase lighting , X**	**Output X**	**1bit**	**W,C**
It is used to switch on the staircase lighting by this object, which will be enabled when selecting "*staircase lighting*" in the parameter "*The mode of time function*".				
5	**Switch out with delay, X**	**Output X**	**1bit**	**W,C**
It is used to switch on the time delay by this object, which will be enabled when selecting "d*elay switch*" in the parameter "*The mode of time function*".				
5	**Switch out with flashing, X**	**Output X**	**1bit**	**W,C**
It is used to switch on the flash output by this object, which will be enabled when selecting "*flashing switch*" in the parameter "*The mode of time function*".				

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6	**Disable time function, X**	**Output X**	**1bit**	**W,C**
This object will be started only when enabling the time function which can be enabled by this object. It will enable the timing function when receiving the value "*1*"; will disable it when receiving "*0*". It will not carry out the controlled telegram sent by the time function during disabled time until enable the time function and restart the time counting function. Enable is a default setting after bus voltage recovery.				
7	**Warning of staircase , X**	**Output X**	**1bit**	**C,T**
It will be enable while selecting warning by this object in the parameter "*Warning mode for ending of staircase*". It will send "*1*" to the bus when the alarm is starting.				
8	**Duration of staircase , X**	**Output X**	**2Byte**	**R,W, C**
This object will be enabled when selecting "*enable*" in the parameter "*Modify the duration via object (0...60059 seconds)*" to modify the duration of the staircase lighting.				

Table 2.3 timing function communication table

3.5.4 Preset function communication object of "Switch Actuator"

	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	Output A	9	Call preset 1/2 , A	1 Bit	Low		✓	✓		
	Communication object	**Number**	**Function**	**Object Type**	**Priority**	**R**	**W**	**C**	**T**	**U**
	Store preset 1/2, A	10	Store preset 1/2, A	1 Bit	Low		✓	✓		

Fig. 2.24 preset function communication object for every output of "Switch Actuator"

No.	Function	Object name	Data type	Flags
9	**Call preset 1/2 , X**	**Output X**	**1bit**	**W,C**
This object is used to call the preset value; call 1 with "*0*" and 2 with "*1*"				
10	**Store preset 1/2, X**	**Output X**	**1bit**	**W,C**
It can be used to save the current switch status as the new preset value; save the new preset value 1 with "*0*" and 2 with "*1*".				

Table 2.4 preset communication objects

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3.5.5 Logic function communication object of "Switch Actuator"

	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	input 1 of logic , A	11	Input 1 of logic , A	1 Bit	Low		✓	✓		
	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	input 2 of logic , A	12	Input 2 of logic , A	1 Bit	Low		✓	✓		

Fig. 2.25 logic function communication object for every output of "Switch Actuator"

No.	Function	Object name	Data type	Flags
11	**Input 1 of logic , X**	**Output X**	**1bit**	**W,C**
This object will be enabled when selecting "*enable*" in the parameter "*The input 1 of logic is*".				
12	**Input 2 of logic , X**	**Output X**	**1bit**	**W,C**
This object will be enabled when selecting "*enable*" in the parameter "*The input 2 of logic is*".				

Table 2.5 logic function communication objects

3.5.6 Scene function communication object of "Switch Actuator"

	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	Scene A	13	Scene handle, A	1 Byte	Low		✓	✓		

Fig. 2.25 scene function communication object of "Switch Actuator"

No.	Function	Object name	Data type	Flags
13	**Scene handle, X**	**Output X**	**1Byte**	**W,C**

It is able to invocate or save the scene when sending an 8-bit command by this object, which will be enabled when enabling the scene function. The definition of the 8-bit command will be described below:

Assuming an 8-bit command (binary coding) as: FXNNNNNN

F: invocate the scene with "0"; save the scene with "1";

X: 0

NNNNNN: scene number (1-64).

1-64 in the parameter setup corresponds to the scene number 0-63 received by the communication object "*Scene handle*". For example, scene 1 in the parameter setup has the same output result as scene 0 in the communication object "*Scene handle*".

Table 2.6 scene function communication object "Switch Actuator"

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3.5.7 Threshold function communication object of "Switch Actuator"

	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	Threshold 1 change , A	14	Change threshold 1, A	1 Byte	Low		✓	✓		
	Communication object	**Number**	**Function**	**Object Type**	**Priority**	**R**	**W**	**C**	**T**	**U**
	Threshold input , A	15	Threshold input , A	1 Byte	Low		✓	✓		

Fig. 2.27 threshold function communication object "Switch Actuator"

No.	Function	Object name	Data type	Flags
14	**Change threshold 1, X**	**Output X**	**1Byte**	**W,C**
This object is used to change the value of the threshold 1.				
15	**Threshold input , X**	**Output X**	**1Byte**	**W,C**
This object is used to receive the threshold sent by other devices.				

Table 2.7 threshold function communication object

3.5.8 Forced function communication object "Switch Actuator"

	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	Forced output , A	16	Forced output , A	1 Bit	Low		✓	✓		

Fig. 2.28 forced function communication object "Switch Actuator"

No.	Function	Object name	Data type	Flags
16	**Forced output , X**	**Output X**	**1bit**	**W,C**
This object will be started after enabling the forced function. Enable the forced function with "*1*", and the other behaviors will be ignored except the forced function; enable the forced function with "*0*".				

Table 2.8 forced function communication objects

3.6 Communication object "Dynamic Regulating Actuator"

3.6.1 General communication object "Dynamic Regulating Actuator"

	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	Output A	14	continuous of regulating , A	1 Byte	Low		✓	✓		
	Output A	4	on-off of regulating , A	1 Bit	Low		✓	✓		
	Communication object	**Number**	**Function**	**Object Type**	**Priority**	**R**	**W**	**C**	**T**	**U**
	reply status (continuous),1 byte...	13	Status (continuous),1 byte, A	1 Byte	Low	✓		✓		
	reply status (continuous),1 bit , A	5	Status (continuous),1 bit , A	1 Bit	Low	✓		✓		
	Communication object	**Number**	**Function**	**Object Type**	**Priority**	**R**	**W**	**C**	**T**	**U**
	Reply status of contact , A	3	Reply status of contact , A	1 Bit	Low	✓		✓		

Fig. 3.29 general communication object "Dynamic Regulating Actuator"

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No.	Function	Object name	Data type	Flags
14	**continuous of regulating , X**	**Output X**	**1Byte**	**W,C**
This object will be enabled when selecting "*1byte (continues)*" in the parameter "*Control telegram is received as*", is used to receive the control command of 1Byte, with range from 0 to 255: the valve will be off with "*0*", on with "*255*".				
4	**on-off of regulating , X**	**Output X**	**1bit**	**W,C**
This object will be enabled when selecting "*1bit on-off control*" in the parameter "*Control telegram is received as*", to receive the command of 1bit: off with "*0*"; on with "*1*".				
13	**Status (continuous),1 byte, X**	**Output X**	**1Byte**	**R,C,T**
This object will be enabled when selecting "*yes, continues control value (1byte)*" in the parameter "*Reply the status of channel for continuous control*", indicating the running status of the current valve and the duty cycle of PWM.				
5	**Status (continuous),1 bit , X**	**Output X**	**1bit**	**R,C,T**
This object will be enabled when selecting "*yes, 0% ='0', otherwise '1' (1 bit)*" or "*yes, 0% ='1', otherwise '0' (1 bit)*" in the parameter "*Reply the status of channel for continuous control*", indicating the running status of the current valve. When selecting "*yes, 0% ='0', otherwise '1' (1 bit)*", the valve will be off with "*0*", others with "*1*"; selecting "*yes, 0% ='1', otherwise '0' (1 bit)*", the valve will be off with "*1*", others with "*0*"				
3	**Reply status of contact, X**	**Output X**	**1bit**	**C,R,T**
This object will be enabled when selecting "*'1'= contact close; '0'=contact open*" or "*yes, '0'= contact close; '1'=contact open*" in the parameter "*Reply the status of contact state*"; indicating the contact position of the current relay.				

Table 2.9 general communication objects "Dynamic Regulating Actuator"

3.6.2 Monitoring function object of "Dynamic Regulating Actuator"

	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	report fault, A	7	report fault, regulating , A	1 Bit	Low	✓		✓	✓	

Fig. 3.29 monitoring function communication object "Dynamic Regulating Actuator"

No.	Function	Object name	Data type	Flags
7	**report fault, regulating , X**	**Output X**	**1bit**	**C,R,T**
This object is enabled when selecting "*enable*" in the parameter "*sending object 'report fault' is*", used to check whether the room thermostat is under malfunction or not. It will go into the fault mode with "*1*".				

Table 2.10 monitoring communication objects "Dynamic Regulating Actuator"

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3.6.3 Forced function communication object "Dynamic Regulating Actuator"

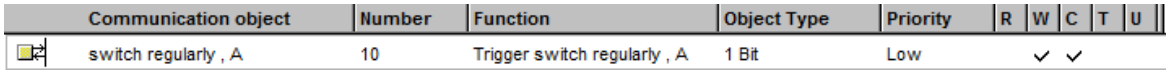
	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	forced operation , A	16	forced operation,regulating, A	1 Bit	Low		✓	✓		

Fig. 3.31 forced function communication object "Dynamic Regulating Actuator"

No.	Function	Object name	Data byte	Flags
16	**forced operation, regulating, X**	**Output X**	**1bit**	**W,C**
This object will be started when enabling the forced function. Start the forced mode with "*1*" and the other behaviors will be ignored; end the mode with "*0*".				

Table 2.11 forced function communication object "Dynamic Regulating Actuator"

3.6.4 Timing function communication object "Dynamic Regulating Actuator"



	Communication object	Number	Function	Object Type	Priority	R	W	C	T	U
	switch regularly , A	10	Trigger switch regularly , A	1 Bit	Low		✓	✓		

Fig. 3.32 timing function communication object "Dynamic Regulating Actuator"

No.	Function	Object name	Data type	Flags
10	**Trigger switch regularly, X**	**Output X**	**1bit**	**W, C**
This object will be started when enabling the timing function to trigger the timing. Start the timing function with "*1*", and stop until time is up with "*0*".				

Table 2.12 timing function communication objects "Dynamic Regulating Actuator"

4. Priority level description

There are 5 priority levels for the whole system:

Switch actuator function: Forced > Safety Priority 2 > Safety Priority 1 >common switch/ Time/preset/logic/scene/threshold (from highest priority to lowest)

Dynamic regulating switch function: Forced > Safety Priority 2 > Safety Priority 1 > monitor/PWM/continue/on-off/switch regularly (from highest priority to lowest)

Only the higher priority behavior can interrupt the lower priority behavior.

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